COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NEWSPAPER

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vice Vendors Move Into Systems Area

• STSC Backs APL Users

By Don Leavitt
CW Staff

BETHESDA, Md. — Users seeking more in-house support for APL-oriented operations got promises of it in spades last week.

Scientific Time Sharing Corp. (STSC), a major U.S. remote computing services vendor keyed primarily to APL, announced plans to market an IBM 370-compatible "minicomputer," its own APL-Plus language support system, a series of VSAPL enhancements for use with IBM's APL and a pair of application packages written in APL but usable by even those without APL knowledge.

The STSC "mini," which is expected to be available in two models that outperform the IBM 370/138 and 148, can be used as a stand-alone system or as an extension to APL-Plus service on the company's network, a spokesman said. To be known as the Quad 100, the "mini" will be offered with its own APL-Plus but will handle any of the languages now available on its IBM

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• GE Brings Out Marklink

By E. Drake Lundell Jr.
CW Staff

NEW YORK — General Electric Co.'s Information Services Division jumped into distributed data processing here last week with a system that provides remote minicomputers, telecommunications, host processing and applications software.

Called the Marklink system, the offering is based on a minicomputer-based terminal system manufactured by Texas Instruments, Inc. to GE specifications and takes advantage of the existing telecommunications network and large host processing centers in GE's time-sharing operation.

GE officials, however, emphasized that the system is not just an extension of its time-sharing services, but rather a transaction processing-oriented system.

The Marklink processor is said to be in the class of IBM's recently announced 8100 information system and comes in memory sizes ranging from 24K to 352K bytes. Up to 16 CRT terminals with Ascii keyboards can be attached to each processor, with each display offering 24 lines of 80 characters. The CRTs can be located up to 2,000 feet from the processor.

The minicomputer can accommodate two floppy disk drives with a total capacity of 20M bytes and a printer. It contains a built-in Bell 201C-compatible modem that operates at 2,400 bit/sec, GE said.

A Terminal-Oriented Processing Language (TPL) is available for application development on the minicomputer.

While the system could be used as a stand-alone processor, Arthur B. Sims, manager of GE's distributed systems program, said it would not be marketed for such applications. Instead, the firm will concentrate on distributed applications, initially in the areas of order entry and inventory control.

In such applications, the processors would be linked to GE's large computer centers in Maryland and Ohio in the U.S. and in The Netherlands. Presently, GE said, 5,000 customers are using those centers — which contain a wide range of computer equipment — for time-sharing and remote batch operations.

The software used for transaction processing at the host center is an extension of GE's Fortran 77 (F77). It is

(Continued on Page 8)

Despite Major Snowstorm

Canadian Show Draws Big Crowds

By Tim Scannell
CW Staff

TORONTO — Subfreezing temperatures and the area's first major snowstorm this year failed to keep the crowds away from last week's Canadian Computer Show and Conference at the International Centre of Commerce here.

More than 12,500 people jammed into the convention hall on opening day last Tuesday and eagerly roamed the red-carpeted aisles of the show floor to type on computer terminals, listen to vendor spiels and fill plastic shopping bags with an assortment of product literature. The three-day show attracted 25% more people than last year, according to show manager Reg Leckie, and a minor parking problem outside the Centre of Commerce was solved when the overflow was directed to a nearby bingo hall's lot.

Aside from the standard buttons, badges, stickers and flags passed out by the vendors, daily drawings were held for color television sets, home computers, watches and vintage wines. If those goodies weren't enough to entice the DP executives, managers and students to each vendor's wares, there were also a number of computerized pied pipers scrambling across the floor whose high-pitched blips and bleeps drew spectators by the dozens.

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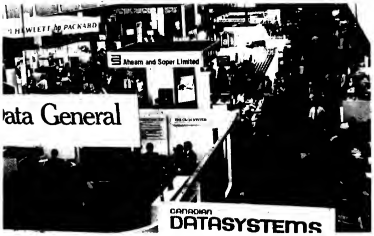

CW Photo by T. Scannell

Executives, students and DP enthusiasts flooded the aisles of Toronto's International Centre of Commerce last week for a glimpse of the latest offerings. Coverage of the Canadian Computer Show and Conference continues on Pages 4 and 5.

Users Blast U.S. Inaction

By E. Drake Lundell Jr.
CW Staff

NEW YORK — Computer users from large multinational corporations blasted the U.S. government last week for its failure to deal with the issues of transnational data flow.

In an informal, not-for-attribution meeting held here at the close of one of the sessions of a conference on "Data Regulation: European and Third World Realities," sponsored by On-Line Conferences Ltd., the 30-some users indicated that the lack of a U.S. policy is hurting their operations around the world.

The group, mainly comprised of the top DP people in some of America's largest corporations as well as representatives of the computer and time-sharing industries, made the first tentative steps toward establishing an ad hoc committee to lobby on the issue.

Speaking as individuals and not for their companies per se, members of the group said there is a real need to impress Congress and the White House with the importance of the issues and the need for an overall information policy for the U.S.

"Today no one in our government has

(Continued on Page 4)

Amdahl Eases MVS Use

By Don Leavitt
CW Staff

SAN FRANCISCO — Software that enables users of Amdahl Corp. 470 mainframes to run IBM's Multiple Virtual Storage (MVS) control program more efficiently under the Virtual Machine (VM/370) facility was announced here last week.

Describing the VM/Performance Enhancement (VM/PE) package to an Amdahl Users Group meeting, an Amdahl spokesman said throughput improvement is the software's major benefit. With VM/PE in place, users can run MVS under VM/370 with "greater than 90% of MVS native state throughput."

First deliveries of the enhancement package are scheduled to go out to users in February.

VM/PE "recognizes the mutual independence and unique value" of VM/370 and MVS, but it avoids the "very high levels" of system overhead that have previously made the combination extremely costly and inefficient to run, the spokesman continued.

Because each required so much overhead, the initial attempts to use

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Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass 02160 Phone (617) 965-5800. Telex USA-92-2529

OTHER EDITORIAL OFFICES: **Washington, D.C.** : 821 National Press Building, 529 14th Street N W , Washington, D C 20045 Phone (202) 347-6718 **England**: Tony Vickers, IDG Publishing Ltd . 140-146 Camden Street, London NW1 9PF Phone 01-267 1201, Telex. 851 264737 **W. Germany:** Hans-Jurgen Ballnath, Computerworld. c/o CW Publikationens, Friedrichstrasse 31 8000 Munich-40, Phone. (089) 34-90-61 Telex 5215350. **Asia:** Hidetsuna Sasaki, Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141 Phone (03) 445-6101 Telex J2424461 **Australia:** John P Costello, Computerworld Pty Ltd , 3 Bruce Street, Crows Nest, NSW 2065. Phone 929-5388, Telex SECCO AA25468 **Brazil:** Eric Hippeau, Data News, c/o Computerworld do Brazil, Servicos e Publicacoes Ltda , Av Rio Branco 156/Sala 1222, Rio di Janeiro ZC 21 Brazil Phone 242-7395 Telex: 212-1507 **Iran:** Shapour Namazi, Mideast Computer, Ferdowsi Avenue, Tehran, Iran Phone 310251, Telex (951)212467

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But MTM Continues

Safeway Warehouse Strike Settled

By Marcy Rosenberg
CW Staff

RICHMOND, Calif. — Union workers at the Safeway Stores, Inc. warehouse here are back on the job after settlement of a four-month strike that protested management's use of a computer-based system for increasing productivity.

But the system — which assigns workers maximum times to complete specific assignments — is still up and running, although its fate is uncertain.

The settlement calls for Safeway and Teamsters Union Local 315 to appoint representatives to a study group to determine whether the productivity program is reasonable, according to a Safeway spokeswoman. Union employees claimed the system, implemented in April 1977, increased their workload 50% to 100% and caused 90% of the warehouse workforce to be fired, suspended or reprimanded for poor performance [CW, Nov. 13].

They also objected to the Method Time Measurement (MTM) standards on which the system is based. MTM assigns average time values to a variety of body motions based on a person's height, weight and age.

Two Choices

Safeway implemented the computerized MTM system at Richmond because productivity there was the lowest of all its domestic warehouses, the firm said. Safeway engineers developed the software for the system, which runs on the firm's IBM 370/168 computer used for order and billing applications at Safeway's Oakland, Calif., headquarters.

The firm is offering Local 315 two choices: a northern California study group to examine the Richmond MTM system only or a national study group to evaluate all such systems used by Safeway.

Six other Safeway warehouses use the MTM system and "while we have had no other strikes over it," the spokeswoman said other union locals submitted the MTM program to arbitrators who, in each case, ruled in Safeway's favor.

Local 315 can also bring the matter to arbitration if the study group can't agree on whether to scrap, modify or rubber stamp the Richmond MTM system, according to John Bacon, vice-president of the Food Employers Council, management's bargaining representative.

Meanwhile, the MTM standards are still at work in that warehouse, but Safeway agreed to withhold discipline "unless a person has demonstrated the ability to perform at a certain pace and is deliberately retrograding."

During the strike, Bacon said, Safeway found that substitute employees — mainly management personnel and "people off the streets" — had "little difficulty meeting the MTM standards and outperformed the regular workforce." Local 315 claimed it never received documented evidence of this.

Though "unhappy" with the settlement, the union agreed to it because "we've been out for four months and didn't get sanctions from the International to extend the strike," according to Ron Teninty, Local 315 union steward and strike coordinator.

The workers, Teninty said, don't object to a computer-based system to measure productivity, but are concerned that the MTM system would be used "solely as grounds to discipline people."

Amdahl Backs MVS on 470

(Continued from Page 1)

MVS under VM/370 were inefficient. Although IBM has made various moves to ease the load, Amdahl clearly felt something more was needed.

With VM/PE installed, users will be able to perform "many previously difficult and often unaffordable tasks," with a single mainframe, the spokesman claimed.

VM/PE is the second software product Amdahl has announced in the past six months to enhance the use of MVS on its CPUs. The first — MVS/SE Assist, introduced in June [CW, June 26] - allows IBM's MVS/Systems Extensions selectable unit to run on the 470s.

The products have significance beyond the use of MVS, however. They are the first major software offerings Amdahl has introduced as its own, industry observers noted.

That suggests concern over what might happen if IBM ever altered its operating systems so they couldn't be used on the Amdahl equipment may be unnecessary, the observers added.

VM/PE will be licensed to users of all currently announced Amdahl CPUs, including the recently introduced 470V/8 [CW, Oct. 23], for $1,500/mo for each installed 470 system. Amdahl is at 1250 E. Arques Ave., Sunnyvale, Calif.

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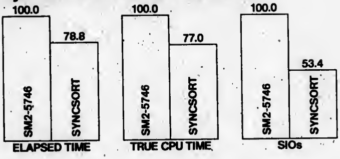
SyncSort DOS vs. IBM's SM2-5746.



But performance aside—if that's possible in a software program—better ask yourself another question before you say "I do" to any DOS sort. How will it fit in if you move up to OS/VS?

Watch out if you try to make that journey with IBM sorting technology as a companion. Because the sad fact is that there is a "compatibility gap" between IBM's DOS and OS sorts. The features don't match!

SM2-5746, for example, has three called INCLUDE/OMIT, SUM and OUTREC. But no IBM OS sort has any one of those features.

So, if you try to migrate from DOS to OS, you may be upgrading your system, but at the same time you'll be downgrading your sort. And if you don't want to set aside a few months of your life for re-programming, then there's only one stark alternative: Divorce IBM and marry SyncSort!

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Seen Obsolete in 1980s

DP Grads Warned On Lack of Business Sense

By Tim Scannell
CW Staff

TORONTO — The graduates of data processing courses churned out each year by the universities here and in the U.S. may fit into the corporate mold today, but they will probably be obsolete in the 1980s.

Academe is so concerned with turning out armies of hardware and software "supertechnocrats" that a serious shortage of effective DP business managers has been developing, according to Robert Humfrey, a partner with Peat, Marwick and Partners of Toronto.

Humfrey was one of several people who spoke here last week at the three-day Canadian Computer Show and Conference. The sessions and show, sponsored by the Canadian Information Processing Society (Cips) along with *Canadian Datasystems* magazine, focused on people, data access and storage and computer systems.

CW In Canada

DP courses and educational programs should provide some groundwork in the business end of the DP profession as well as its technical aspects, Humfrey stated. DP graduates should have a "real-world exposure" to the business environment, including coping with management problems, understanding management processes and knowing how to implement financial and corporate operating controls.

Most companies mistakenly assume that tomorrow's managers will emerge savior-like out of their DP departments and fulfill all corporate expectations. But the companies don't realize that most of these chosen people do not have sufficient training in a business environment, Humfrey said.

The DP staff is usually too knowledgeable in hardware concepts and too ignorant about the world of feasibility studies, quantitative evaluations and computer audits, he explained. "As programming and computers become more commonplace," he added, "there will be an increased emphasis on management aspects and on ways to effectively use various hardware tools."

Colleges and universities could prevent the extinction of successful managers by placing "quantitatively and analytically minded" DP people in basic business applications, Humfrey believes. These applications include "on-the-road" sales, warehouse and clerical positions.

Unfortunately, most students want an immediate mathematics involvement with a corporation and miss out on basic business training, Humfrey noted. "Not to sufficiently train the DP professional is to throw away the profession and relegate it to the backroom," he pointed out.

Tackling the Problem

Randy Klawitter, a program administrator with the University of Waterloo's Department of Coordination and Placement, agreed with Humfrey's assessment of management's future, but added that a great many programs do exist that attempt to tackle the problem. The University of Waterloo, for instance, has a cooperative education program that incorporates work terms into the DP curriculum.

Students attend eight four-month academic terms — structured classroom lessons — and spend the rest of the four-year, eight-month program in a business environment, putting their knowledge to use.

Waterloo's co-op program is the second largest of its type in North America and boasts a 95% placement record. Students in the program are evaluated by both their employers and the university and, after graduation, are placed in jobs by a computerized "dating game" type of match-up.

Klawitter

Photos by T Scannell
Humfrey

Employer's needs as well as student objectives are compared until a suitable match is made, Klawitter stated.

Students are required to rank each employer when they finish their six four-month work terms, which gives the university and future students an insight into corporate placement and business techniques.

University coordinators are appointed to act as student-employer liaisons, "guiding each toward a happy marriage or abrupt divorce if it serves the needs of both parties," Klawitter remarked.

Show Attracts Large Crowds

(Continued from Page 1)

Equipment displayed throughout the convention center ranged from simple home computers to sophisticated distributed data processing systems. Although the Canadians were genuinely interested in the various minicomputers and mainframesshown on the floor, a booth offering personal computer portraits seemed to attract the largest crowd — mostly of students.

A number of U.S.-affiliated firms demonstrated to the crowds products already introduced in the U.S. Data General Ltd. spotlighted its CS/20, CS/60 and Eclipse M/600 computer systems; Micos, Inc. presented its 32M-byte Micos 300 disk system; and Cincom Systems of Canada, Ltd. unveiled its Total Information System (TIS) software package.

Pertec Computer Corp. (PCC) and PCC Canada also exhibited double-head and double-density disk drives as well as the XL40 and XL20 distributed processing systems.

Users Blast U.S. for Lack Of Transborder Data Policy

(Continued from Page 1)

the charter to set information policy and to negotiate with foreign governments in this area," one speaker noted.

Even finding whom to talk to in government on these issues is a problem, they said. "You need to go on an archaeological expedition to find anyone who knows anything about it," one noted.

In addition, the group expressed its feeling that the Administration is unaware of the economic impacts of regulations in Europe.

The representatives were particularly critical of the National Telecommunications and Information Administration, which they feel has ignored the issue just as its director, Henry Geller, chose to ignore this conference by cancelling his plan to attend at the last minute.

Critical of Business

But while the group was particularly harsh on the Administration for a lack of action in the area, it also saved some criticism for U.S. business, which, it feels, does not fully appreciate the scope of the problem either.

"We all need to educate our top management" on the newly raised problems of restrictions on data flow, one member said.

The users agreed they should try to make top management in their firms aware of the problem and try to get management to take lobbying action through such business groups as the Business Roundtable.

"The U.S. is in a reacting mode today," one said, adding, however, that quick action needs to be taken before U.S. firms are restricted from doing business in certain countries.

The group seemed to agree that it would probably take some "really serious horror stories" before the U.S. government and major businesses would act, but members were worried that by then it might be too late to take any remedial action.

The group was particularly concerned about the amount of work going on in Europe that will affect their companies' ability to process and transmit data over national boundaries.

For example, the conference outlined the four existing European privacy laws (in Germany, France, Austria and Sweden) and the possible effect they might have in limiting the use and storage of information linked to individuals.

At the same time, the planned draft conventions in the works both at the Organization for Economic Cooperation and Development and the Council of Europe were outlined at the conference, where it was noted that both would probably recommend draft laws that would call for establishing data inspection boards by all countries agreeing to follow those laws.

While most of the caucus members agreed that they had seen few economic consequences from these laws to date, they indicated that in the future these laws could have a very limiting and restricting effect on the way they operate around the world.

"This is no longer just a policy issue," one of the users said. "It's now an operational issue."

But while these laws have been developed, restricting the actions of U.S. firms, the DPers here said they feel the government has let them down by not establishing policies in these areas.

Focusing on Employee Development Urged

By Tim Scannell
CW Staff

TORONTO — The DP community's quest for more hardware and software knowledge has not only resulted in an abnormally high turnover rate within the industry, but has also produced an underutilization of human resources at the management level.

"Blessed is he that knoweth the answer, for there is no answer," Douglas Whitney, an assistant vice-president with Manufacturer's Life Insurance Co. (Manulife), intoned.

Whitney, who deals with human resources development at Manulife, discussed DP careers and management objectives last week at the Canadian Computer Show and Conference here.

A company seriously considering a management training plan of action should first establish certain criteria for management development, Whitney said. Standards or levels of performance should be set, and a formal evaluation of each employee's "end result" has to be incorporated into the company's system so that the DP department is aware of what goals to shoot for.

CW In Canada

Stringent selection standards are important during recruiting to screen the initial applicant and to establish a primary level of quality, Whitney noted. Hiring practices should adhere to these qualifying standards without compromise until every available position is filled.

However, Whitney warned that what might be good one year is not necessarily good the next — in hiring practices or in employee development. Employees, particularly in the DP department, should be allowed a certain amount of mobility and organizational exposure.

There are, of course, a great number of problems associated with running a people-oriented shop. Concentrating on management development both within the DP department and on the outside will increase DP overhead costs, and shifting employees to maintain interest will eventually affect the operation of the DP system as a whole, Whitney explained.

An overly effective management program can also create problems if too much talent is siphoned from the same area, creating internal conflicts and pressures, he pointed out.

Morrison Hewitt, the DP director of the Toronto-based management consultants Woods Gordon and Co., stressed the "winning team philosophy" of internal organization and management. Employees are concerned with the stature and image of the DP department "and like to belong to a successful organization . . . not a losing team," Hewitt said. Data processing itself should be perceived as a means to achieve personal as well as company objectives.

Hewitt explained that a company's "set of plays" should include the appropriate tools in the development phase, such as documentation and equipment specifications and more than adequate hardware resources. The company should also try to eliminate laborious tasks and establish a productive environment where each person knows that his job, is important to the final result.

Contrary to popular belief, Hewitt said, "DP people don't react differently than people in other departments."

Basically, people in the DP department want their skills to be challenged and to complete an activity as a whole. Responsibility, relevance to the project and feedback on his efforts are also important to the employee's delicate morale.

Reinforcement and recognition are the employer's two greatest weapons against disinterest and eventual migration in the DP industry, Hewitt said.

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Postal Service Progressing on Electronic Mail

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service's plans to provide electronic mail service are progressing both domestically and internationally.

On the domestic scene, Postmaster General William F. Bolger will ask the board of governors of the U.S. Postal Service for the authority to begin a pilot program of the Postal Service's proposed Electronic Computer-Originated Mail (Ecom) service.

According to a Postal Service spokesman, Bolger will put forward a proposal for a 15-month "preliminary phase" of the Ecom system at a meeting of the board of governors in Houston tomorrow.

Bolger will ask for the temporary implementation of the Ecom plan because the Postal Rate Commission has not yet acted on the Postal Service's official request for authorization, according to postal official Robert A. Becker.

Becker explained that under the Postal Reorganization Act, if the rate commission does not decide on a proposed new service within 90 days, the Postal Service may begin the service on a temporary basis after 10 days' notice.

The Postal Service originally filed its request Sept. 8 for authorization to offer Ecom. It does not appear, Becker said, that the rate commission will decide on Ecom within that three-month period, which ends this week.

He said the Postal Service already has at least 25 post offices "strategically located" that are equipped to handle the electronic mail service, a joint venture with Western Union [CW, Sept. 25]. The post offices would make use of terminals already in place for the Mailgram service offered by Western Union.

In addition, Becker said, the Postal Service already has at least five companies lined up for Ecom service. The five are among approximately 750 companies the Postal Service has identified as having sufficient mail volume to economically justify Ecom use.

By the end of the first 15 months of the proposed "preliminary phase," the Postal Service hopes to have about 60 companies using Ecom, Becker said.

On the international level, the Postal Service recently announced a contract award of $88,550 to ITT World Communications, Inc. for international telecommunications circuitry for the Postal Service's international Electronic Post (Intelpost) system.

Under the contract, ITT Worldcom will provide the communications channels for transmitting data via satellites between the U.S. and Argentina, Belgium, the Federal Republic of Germany, France, Iran, the Netherlands and the U.K.

The Postal Service announced plans for Intelpost in March. The satellite communications system will provide high-speed transmission of facsimile copies of letters and other documents.

The program is being conducted with the technical and planning assistance of Communications Satellite Corp. (Comsat) [CW, Sept. 25].

ITT Worldcom will install communications circuits, varying in speed from 9.6K to 50K bit/sec between the U.S. and the seven participating countries, the Postal Service said. The Postal Service headquarters building here and the World Trade Center in New York City will serve as U.S. service centers for Intelpost. Transmission centers will also be set up in the other countries.

Intelpost, scheduled for initial testing next March, will utilize high-speed dedicated circuits provided by an international record carrier, high-speed digital facsimile equipment for scanning and printing and minicomputers for store-and-forward functions.

Comsat has been authorized to acquire Rapicom Superfax 500T and 500R scanners and printers for installation at the New York and Washington service centers, the Postal Service said, and similar equipment will be used in the other countries.

The Rapicom equipment is described as being capable of scan/print times of six seconds per page and resolution of 200 lines per inch. The minis will be Digital Equipment Corp. PDP-11/34s.

STSC to Offer In-House APL Support

(Continued from Page 1)

counterparts, he added.

While the Quad 100 is clearly different from the IBM 8100-class mini introduced by General Electric Co. this week (see accompanying story), the introduction of both hardware and software by these two remote computing services vendors continues a trend started earlier this year with announcements from Automatic Data Processing, Inc., Keydata Corp. and National CSS, Inc.

Although STSC has said first customer shipment of the Quad 100 is expected in the first quarter of 1979, the spokesman also said no decision had been made yet on which of several hardware vendors will provide the units.

But, he argued, the decision itself is virtually immaterial since STSC will be offering the "mini" as its product, with full support. The user "shouldn't have to care who built the box," he said.

All the hardware vendors now being considered are viable alternatives with equipment that can meet that delivery schedule, he said, adding that the user needn't be worried about specifics because all of the systems being evaluated are in the "138/148 class, and that's what's important."

Being in that class means the Quad 100 will be a machine with at least 1M bytes of memory and five channels. "Most of the candidate machines meet those specifications and are expandable to 16 channels," he noted.

STSC sees the Quad 100 as particularly useful at universities where a lot of work is appropriate for handling with APL but the institutions are generally unwilling to spend much money on outside time-sharing, the spokesman said. On the other hand, a number of commercial firms have also shown an interest in the product, he added.

In addition to running on the Quad 100 and on STSC's own network, APL-Plus will be available to users with IBM or compatible mainframes, where it can be used under OS/MVT or in a "virtual machine" directly under IBM's Virtual Machine facility (VM/370). Running in VM "native mode" means users can avoid one of the layers of overhead that is required in IBM's APL environment, the spokesman said.

The STSC system is said to be much faster than IBM's, including internal enhancements to speed up the handling of various "combination characters," for example, that perform table lookups. Administrative software — "dump restore, accounting, backup . . . everything it takes to run a data center" — is also part of the package, according to STSC.

A report print formatting facility and a comprehensive file system — "far better than IBM's, which lets you use CMS files" — are also included in APL-Plus. So are the Automatic Control of Execution (ACE) facilities introduced by STSC last summer [CW, Aug. 28] to simplify the users' interface with the APL system, the spokesman added.

The VSAPL enhancements "begin with formatting and file management" and include various other features designed to run under the control of IBM's VM/370 as an interactive processor, he said.

STSC's experience in developing systems for corporate financial management is reflected in the two application programs the company is releasing for in-house use. Both the Financial Planning System (FPS) and the Comprehensive Manufacturing Control System (CMCS) were written in APL, but that is transparent to users, the spokesman stressed.

FPS can be used for both financial planning and modeling, he said, adding that it is "particularly adaptable" to multidivisional and diversified corporation planning environments. CMCS is intended to assist large, discrete manufacturers in shop floor control, forecasting and material requirements planning (MRP) operations.

Unable to provide specific details on how much each offering may cost users, the spokesman explained STSC felt it had to release news of its plans now, even though they are still incomplete, because stock for the company is publicly traded.

He noted, however, that the Quad 100 will "probably be in the $500,000 to $1 million range," with specific cost depending on the model and options selected.

The APL-Plus software, as a separate package, will "probably" cost "in the neighborhood of $100,000" with "some sort of usage surcharge" on top of that front-end charge. A lot of the $100,000 will be earmarked for installation help, he emphasized.

CMCS will also cost $100,000 or more, up to $500,000, depending on features included and the amount of customization effort STSC has to put into the implementation. FPS as a package still has not been priced.

STSC is headquartered at 7316 Wisconsin Ave., Bethesda, Md. 20014.

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Vendor Gives Up on Debugging

System Removed From Princeton Library

By Marguerite Zientara
CW Staff

PRINCETON, N.J. — After two years of field-testing a bug-ridden book inventory control system, Princeton University's library has now gone to a manual file system — 3- by 5-inch cards — as an interim measure until a replacement computerized system can be selected.

Princeton, along with the Arlington, Va., County Public Library, was used as a test site for two years for the 3M Co.'s Library Inventory Control System (ICS) at no charge for either hardware or software. Based on Universal Product Code (UPC) labels, the system was designed to link a patron's name with a book number in a light pen charge-out operation and later to break that link when the item was returned. It also was to have kept cumulative records of fines, bills issued and bills paid by each patron of the library.

In spite of the system's intended functions, however, it was not fully designed and tested at the time of its installation at Princeton, according to Abigail Dahl-Hansen, associate librarian at the university. The system's problems manifested themselves in "crashes," sometimes as often as 50 or 60 times in an 8 a.m.-to-midnight day, she said.

With an average of almost four crashes per hour on bad days, smooth operation of library functions became difficult. In addition, because of library personnel unsophisticated in data processing, as well as unsophisticated message output by the system, system crashes were not always recognized immediately, Dahl-Hansen said.

Once the problem was acknowledged, however, bringing the system back up was simply a matter of "pressing a restart button," she said. But with 2 million books to keep track and more than 6,000 patrons using the library, Princeton could not afford inventory control problems.

'Software Looping'

According to a 3M technician who worked closely with Princeton but has since moved to another division within the company, the problem boiled down to "software looping." By January 1978, the spokesman claimed, the system was at an acceptable level of operation, with an average of two "loops" — crashes — per day.

According to the technician, Princeton circulated its first book on the system in January 1977. There was "some file degradation" during the first six months of operation, he said, but it was cured by the ninth month.

In September 1977, Princeton added its reserve books section to the computerized system, doubling system throughput. "When you have a test site and then double your throughput, you have to expect more bugs to come out of the cracks," the technician said. There were indeed more "bugs," but by last January the system was operating with an average of two crashes per day, a level he considered acceptable.

Nevertheless, at the end of February, 3M Library Systems Manager Dr. Graham Gurr announced 3M was giving up on ICS. "The advanced systems of ICS make it higher priced than competing systems," Gurr said at the time, adding that the limited market for "such an advanced system" didn't warrant 3M's continuation in the business.

The firm did not withdraw entirely from the library market, however, and continues to offer its library terminals to "circulation system builders," according to a spokeswoman.

'New' Manual System

The first week in June saw the removal of the hardware from Princeton's library after the judicious printing of labels to be pasted on 3- by 5-inch cards for the "new" manual system.

So, with two years of computerization behind it, Princeton's library spent "several months" reconverting to a manual system, according to circulation librarian James Cogswell.

"It meant a lot of hours spent pasting those silly labels onto 3-by-5 cards," Cogswell recalled.

Things at Princeton are now running "slowly by smoothly," he added, although things were "frenetic" and "chaotic" during the conversion process. "We've had to add temporary personnel to do essentially nothing but file 3-by-5 cards," he said.

Princeton's 3M system had consisted of a Data General Corp. Nova 312 minicomputer with 48K bytes of 16-bit words. A Control Data Corp. Model 9762 disk drive was configured for 80M-byte disk packs, although the system's two disk packs were formatted with 66M bytes each.

The system also included six 3M-manufactured on-line keyboard terminals and six 3M Charger light-pen terminals, according to a 3M spokesman. The system utilized a Systems Industries, Inc. controller and operated under the KRDOS operating system.

The Arlington County Public Library used the same configuration for conversion only and therefore was not in as critical a stage as the circulation system, the 3M spokesman said. The firm removed Arlington's test system at the end of September.

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Victory Goes to Warner

By Tim Scannell
CW Staff

RICHMOND, Va. — Three weeks after a malfunctioning computer unofficially declared John Warner the winner of the U.S. Senate race here, the Virginia Board of Elections' official canvass showed him to be the actual winner over Democrat Andrew Miller in what has turned out to be the closest general election in recent state history.

Warner defeated Miller by exactly 4,721 votes — or .4% of the more than 1.2 million votes cast in the Nov. 7 election, according to last week's canvass. The unofficial returns, processed by the News Election Service (NES) in New York, had shown Miller losing to Warner by less than .3%, or 5,190 votes.

Problems with the NES computer on election night began when the system started listing more voting precincts than the state actually has. The computer was also plagued with numerous downs and delays, which subsequently caused problems with election returns across the country [CW, Nov. 13].

In addition, several problems with the counting of absentee ballots were caused by various precincts that submitted these returns on election night and others that processed them separately.

Miller has still declined to concede defeat, labeling himself an "apparent loser," and has until Dec. 7 under Virginia election laws to demand a precinct-by-precinct recount. Recounts are reportedly allowed in Virginia when the vote count puts one candidate less than 1% behind another.

In the event of a recount, the loser would have to pay its cost, which is estimated to be a minimum of $120,000 in this race.

Meanwhile, Warner has accepted his victory and is prepared to represent the state in Congress.

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DP-Aided Search Results In Arrest for Hit-and-Run

By Tim Scannell
CW Staff

BOSTON — Following a massive 300-man, computer-assisted investigation, Metropolitan District Commission (MDC) police here arrested a suspect in connection with a recent hit-and-run accident that seriously injured MDC patrolman Harold MacGilvray.

Douglas Peterson was arrested at his home in Weymouth, Mass., and charged with operating a motor vehicle under the influence, operating to endanger, driving with a suspended license and leaving the scene of an accident after causing personal injury.

Peterson admitted operating the hit-and-run vehicle at least two hours before the incident occurred, but claimed he did not remember being involved in the early-morning accident.

The investigation closed in on the suspect after MDC detectives pieced together Peterson's actions before, during and after the accident, placing him at the scene of the crime.

"We traced his movements from 11 p.m. Sunday and into Monday morning," according to Lt. Det. Thomas Keough, who spearheaded the investigation.

MacGilvray was struck three weeks ago, by a speeding car and seriously injured as he was questioning another driver in the breakdown lane of Boston's Southeast Expressway [CW, Nov. 27].

MDC police located the hit-and-run car by pouring through stacks of computer printouts listing more than 16,000 automobiles that matched a description provided by an eyewitness at the accident scene. After eliminating approximatley 10,000 possibilities, more than 300 MDC policemen worked around the clock to locate every remaining car on the list until the guilty vehicle was found.

MDC detectives will reportedly continue their investigation to determine if MacGilvray was intentionally hit or struck as the car swerved to avoid the vehicle stopped in the expressway's breakdown lane.

GE Adds Marklink System

(Continued from Page 1)

upwardly compatible with F77 with the addition of data base and communications enhancements and, while it can be used with simple terminals, it was specifically designed for use with the Marklink miniprocessors, GE said.

The software allows prompting, editing and data base updates with full concurrency, consistency and recovery capabilities, GE said. It interfaces with multistream communications through an interactive host application that recognizes attachments of new data streams, individual messages and line breaks.

In addition, the host center recognizes each mini on the system for remote diagnostics and service recording.

The minis will be tied into a host center through the GE teleprocessing network. They will use a protocol said to be compatible with the CCITT X.25 packet protocol at the electrical and packet level but extended to handle dial-up as well as leased-line communications.

Error-detection routines are built into the system and message acknowledgment, including application-to-application message acknowledgment, is provided.

The circuits used for multistream or packet communications are 2400 bit/sec, GE added, noting that the IBM 3780 protocol is also supported on the system.

In addition to hooking into the GE network, the mini can also communicate with a firm's in-house computer system, GE said.

Each unit in the overall scheme is priced separately, with the mini, telecommunications links and host processing each carrying its own price tag.

A minimum minicomputer configuration including 64K bytes of main memory, one CRT and one floppy disk drive will rent for $800/mo on a two-year lease and sell for $21,230. A maximum configuration with 352K bytes, 16 terminals and 20M bytes of floppy storage will rent for $3,690/mo and sell for $93,290.

Dial-up communications is available at a flat rate of $25/hour. Leased lines are available for $825/mo if the using location is within 50 miles of a GE network node and $1,490/mo if located farther from one of the 600 nodes in the network.

Host processing services are priced according to the amount of storage and processing required. However, Sims indicated that for $15,500/mo, a user would receive enough storage and processing for a network with 10 remote sites used to perform order entry.

Users will be quoted a fixed price for such applications, he added.

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Cbema Seeks Split of Its Ansi, Industry Roles

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Computer and Business Equipment Manufacturers Association (Cbema) said recently its role as secretariat for U.S. DP and office equipment standards committees will be separated from its own internal standards program.

The association headquartered here, has served as the secretariat for the American National Standards committees X3 (computers and information processing) and X4 (office machines and supplies) since they were formed by the American National Standards Institute (Ansi) in 1961.

Cbema will finance and staff the two secretariats, which perform all the administrative functions for the two standards committees, for at least the next year, according to Catherine A. Kucharik, who will manage the X3 secretariat. However, the association is considering eventually divorcing itself entirely from the two secretariats, she said.

The first step, the separation of Cbema's own standards program from the association's support of the secretariats, will allow the association to determine the costs of the two programs, she explained. Currently the secretariats and Cbema's internal standards program are budgeted together, with the cost of the two programs set at $192,000 for the next year.

The association's Standards Program Management Committee is working on a study, to be completed by next June, to determine what additional steps — if any — should be taken to further dissociate Cbema from administration of the standards committees.

Oliver R. Smoot, Cbema's vice-president, stressed that "the one option we are not contemplating is abandoning the secretariat function without an assured continuity in the [committees'] activities." Cbema is looking for an "acceptable alternative secretariat" to recommend to Ansi, he said.

Ansi determines the procedures for U.S. standards committees and is the U.S. representative to the International Standards Organization, headquartered in Geneva, Switzerland.

Smoot noted Ansi is studying the possibility of establishing a professional secretariat function of its own which would "provide a definite alternative" to Cbema and organizations that function as secretariats for other standards committees.

Despite the Cbema decision to separate its standards roles, the association will not become a member of the X3 or X4 committees, Kucharik said. Cbema believes it is adequately represented on the committees by its member companies that are also members of the two standards committees.

Confusion About Role

Cbema has operated the two secretariats since the inception of the X3 and X4 committees in 1961. "The members of the association felt that they would be best able to contribute and guide" the committees, Kucharik said, explaining the origin of Cbema's secretariat role.

But the secretariats are a drain on the association's resources, she noted, and the manufacturing community has been somewhat confused about Cbema's role in standards making.

"Some people don't realize Cbema exists," she said, and some do not understand Cbema's relationship to Ansi. Cbema provides only the administrative functions for the X3 and X4 committees; "We don't provide the technical expertise."

Conversely, Cbema staff members whose work is related to the association's role as secretariat for the two committees "remain impartial" and are not influenced by any standards activities on the part of the association itself, she said.

The separation of the two roles in standards "is going to alleviate confusion," she predicted. "I think it's going to focus the actual secretariat duties in one spot."

Educom to Study Resource Sharing In Academe

PRINCETON, N.J. — Educom has been awarded a $362,000 National Science Foundation (NSF) grant for a 20-month study aimed at identifying and understanding the major factors associated with computer-based resource sharing in academic research and teaching.

Educom is a nonprofit educational corporation that promotes the most effective use of computing and other technologies in higher education.

The study will examine nine established organizations that actively facilitate computer-based resource sharing and three discipline groups that use such resources, according to Educom President James C. Emery, who is principal investigator for the project.

Factors that facilitate sharing and barriers that impede it will be identified, and the impact of sharing on research and education will be assessed.

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Kentucky Druggists Phone in Medicaid Claims

By Marguerite Zientara
CW Staff

FRANKFORT, Ky. — In what it considers a breakthrough step toward a paperless society, the Kentucky Department for Human Resources (DHR) here has undertaken a pilot project allowing pharmacists throughout the state to input Medicaid claims directly to its computer via telephone.

The Pharmacy Telephone Transmission System, in operation since September, involves 10 volunteer pharmacies in Kentucky. The state normally receives about 290,000 Medicaid claims per month from 870 pharmacies.

To access the system, a pharmacist calls a toll-free number that connects him directly with the department's CPU. He is then instructed by voice response to enter his claims information, which is done on a push-button phone. If a user does not have a push-button model, the DHR furnishes him with an adapter pad.

Necessary Information

Data elements include the pharmacist's "provider number" — ID — as well as a personal identifying code. The pharmacist also inputs the drug's identifying number and a recipient ID number comprised of the Social Security number (SSN) and a check digit that confirms the SSN's accuracy. Other information includes the quantity of drug dispensed, the date on which the prescription is filled, the prescription number and the billing amount.

If a physician has requested a specific drug rather than its generic equivalent, the pharmacist must input a "physician override" code as well.

If an error is made in entry, such as giving the recipient ID number the wrong number of digits, a verbal error message will be relayed to the pharmacist over the phone.

When all information has been entered correctly, a number is assigned to each transaction. "That way, when the pharmacist gets his payment from the Medicaid program, he can go back and check the transaction numbers to make sure he was paid for each transaction he put into the system," a DHR spokesman explained.

Claims information can be input from 8 a.m. to midnight to a 36K-byte IBM System/7 that was acquired specifically for this program. It is then transferred to DHR's dual IBM 370/168s. The 370s are channel-connected to the System/7 and have 16M bytes of core memory.

Accuracy Checks

Twice a week a payment program is run against the DHR's central data base to assure the accuracy of claims information. This program validates all the data elements that have been input to the system since the previous check. For example, it matches all the provider numbers against a file of all pharmacists who have been approved to participate in the program, the spokesman noted.

It also checks recipient ID numbers against the recipient eligibility file to make sure each recipient was eligible for Medicaid on the date the drug was dispensed. In addition, the payment program determines whether a duplicate claim has been filed within one payment run.

Using an algorithm, the program then calculates the payment amount due for each prescription and issues checks to the appropriate pharmacies. Checks are printed on an IBM 1403 printer.

Better Than Scanning

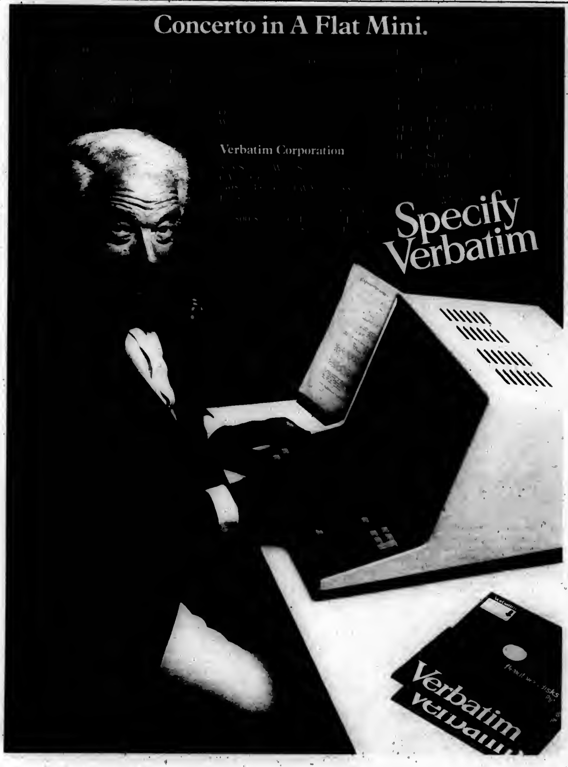
Before the pilot program, pharmacists submitted claims for processing either on magnetic tape to service bureaus or directly to the department's IBM 1288 optical scanner. The 1288 produced a tape that was input to the 370's data base. That method is still offered as an option.

"The new system appears to have a good advantage over the submission of optical scanning sheets, because with the latter you have to be very careful how you fill out the sheets," the spokesman said. "It appears the data coming in through the new system is of better quality since people don't have to be so careful in transcribing the information."

The system was evaluated at the end of November on the basis of time and money saved as well as qualitative factors, such as whether pharmacists think it is a better system than the earlier one, the spokesman said.

If results show that the system was successful, it will be offered as an option to the 870 pharmacies presently participating in the Medicaid program.

The system has been "extremely well accepted by the pharmacists who have used it," according to Frank Gormley, systems support manager for the DHR's Division of Management Systems. In fact, an unanticipated high usage of the system necessitated enlarging memory storage areas.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Good Picture of DP Market?

DP Vendors' Depositions at Issue in IBM Trial

By Connie Winkler
CW Staff

NEW YORK — Stooping under the weight of the eight fat volumes he was lugging and grinning with all the attention he was getting, IBM counsel Ronald S. Rolfe plopped the deposition in front of the witness.

Each volume was at least as thick as a ream of paper — and this was only one of 624 depositions from DP vendors which have been admitted in the U.S. vs. IBM antitrust trial here.

Rolfe was not the only one who had difficulty handling the depositions, which now fill 13 four-drawer file cabinets and numerous cardboard boxes in the courtroom. The U.S. Justice Department filed numerous objections to 109 of the 624 depositions and spent a full day in court objecting to the first handful.

As negotiations evolved, the government finally allowed all 624 to be introduced as evidence — with one major reservation. The government reserved its motion to strike the depositions if IBM does not provide an adequate foundation for them in the course of the trial.

When the compromise on the depositions was made, government lead lawyer Robert J. Staal called it a "legal maneuver." Such a motion to strike would probably come at the end of the case, Staal said.

Basically, IBM has maintained that the depositions give a good picture of the DP market. The government says the depositions are like trying to add apples, oranges, pears and baseball bats. No definition of "DP" has been included in many of the depositions, nor has any foundation been laid showing that they measure a valid market, the government contends.

IBM had a legal duty to define DP products and services at the time the depositions were taken, according to the government.

Key to Defense

The depositions are key to IBM's ability to show it does not have a monopoly share of the DP market. A deposition is a written statement taken under subpoena in the presence of both parties.

In this case, 811 firms were asked to supply DP revenues, and that list was later pared to 624 by IBM. The firms range from AT&T to one firm that reported oceanographic equipment among its DP revenues. In the chambers of Judge David N. Edelstein, government counsel objected that there was no basis for selecting deposed companies nor was there any basis by which the reported revenues could be added. Further, the government argued, there is no evidence the DP market as measured by IBM is a relevant market concept for the court.

IBM will call about seven economic witnesses who will define DP, and under none of these definitions will IBM be shown to have a monopoly share, Rolfe said.

IBM also argued that the depostions are relevant measures of the DP market and are the best information that could be obtained. Findings from these same depositions were accepted in the Memorex vs. IBM jury trial, IBM counsel pointed out.

Again in U.S. vs. IBM, IBM is expected to compare its own revenues to a total compiled from the depositions. IBM's pretrial brief says "IBM's share of the domestic DP revenues of the more than 700 companies deposed in connection with the parties' joint census declined from 55% in 1957 to 32% in 1972."

The first part of the comparison was put in place last month when IBM Controller C. Arthur Northrop presented IBM's DP revenues for 1952-1972. The second part was placed by the IBM witness on the stand last week, Raymond J. Dubrowski. Dubrowski is a partner of Price, Waterhouse & Co., which undertook the three-year, $5 million job of tallying all the revenues reported in the depositions.

No Better Way

A certified public accountant who has been with Price, Waterhouse 25 years, Dubrowski said he could think of no better way to compile such statistics. "All the material came to me as a result of sworn statements under court order and subject to examination by attorneys," he said. "I couldn't see where better information could have been obtained."

On cross-examination, government counsel Alan Nisselson drew out of Dubrowski that:

- The special audit done for IBM's law firm was unlike a financial audit, and there were no additional checks on the information supplied.
- IBM determined which products and services were DP. If Dubrowski had questions, as he did with 14 of the statements, he conferred with experts recommended by IBM counsel.
- Price, Waterhouse does general auditing for IBM annually and bills between $1 million and $2 million.

Nisselson also picked through specific depositions showing that, in some cases, foreign-manufactured products, research work and products totally unrelated to DP were counted in DP revenues.

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Postal Service Compliance With Privacy Act Uneven, Internal Audit Contends

By Jack Kirchner
CW Washington Bureau

WASHINGTON, D.C. — An internal audit has found uneven compliance with the Privacy Act and inadequate security procedures for records systems at U.S. Postal Service headquarters here.

Although the Privacy Act has been implemented by the Postal Service "for the most part," there are areas that "still require attention," according to the recently completed audit report prepared by the post office's Special Investigations Division.

The major problem area is records systems, which "are not given adequate security. A uniform set of security standards has not been developed under which the Postal Service can operate."

In addition, "security guidelines that have been issued are not being enforced by the supervisors," the audit found. This has left the Postal Service "open to possible civil suit. The Postal Service could be compromised by information being released without authorization or prematurely."

Examples of Violations

Citing examples of Privacy Act violations and security breakdowns uncovered during the audit, the report described one case in which a Postal Service department "allowed an unauthorized person who is familiar with the department's computer system access to the computer on Saturday." During that time "he had access to all the information stored on the computer."

Furthermore, "throughout Postal Service headquarters, files from systems of records are left on top of desks, stacked on the floor and in unlocked equipment," the audit found. "This information is accessible to any person presenting an employee building pass during nonworking hours."

The Special Investigations Division recommended that a uniform set of security standards be developed for the records systems. Postal Service management, however, said it sees the problem as one of enforcing existing standards rather than issuing more detailed ones.

Principal Findings

The audit, conducted from June 1977 through January 1978, reviewed internal controls, training, adherence to regulations and cost factors involved in implementing the 1974 Privacy Act. Some of the audit's principal findings were:

- The current Privacy Act compliance staff "may not be sufficient to keep abreast of the assigned worklaod." The records officer "has done a commendable job in resolving emergency situations," but the smallness of his staff "has resulted in deferring projects that are necessary to meet the criteria set forth in the Privacy Act."
- The Postal Service has not made a commitment to educate employees concerning their duties under the Privacy Act. "Training being provided to employees does not adequately prepare them to comply with the Privacy Act while working with systems of records," according to the audit report.
- Individuals who are asked to supply information about themselves are not being adequately informed of their rights under the Privacy Act. This, too, was attributed to a lack of adequate employee training.
- There is no adequate, uniform system for recording disclosures of personal information.
- New systems of records are created or old ones are modified without proper notice being given to the records officer. "This is caused by lack of awareness on the part of headquarters employees concerning the requirements of the Privacy Act," the report noted.
- The Postal Service is not answering Privacy Act appeals "in a timely manner."

After calling for tighter management control and better employee training, the audit report concluded, however, "the records reviewed during this audit did not show the Postal Service to be in open violation of the intent of the Privacy Act.

"The thing that did stand out was the fact that neither the information systems executive nor the custodians of most systems of records had done anything to ensure accuracy, relevance, timeliness and completeness" as mandated by the Privacy Act.

Manual to Detail How to Uncover Computer Crime

MADISON, Wis. — *Assets Protection*, a security and investigation journal based here, this February will publish a "Computer Crime Investigation Manual" to assist prosecution of computer crime.

The "investigator's working resource" will focus on "how professional investigators have conducted actual investigations into computer crimes — not on textbook theory," the publisher explained.

The manual will also canvass the various ways in which computer crimes are discovered and their perpetrators brought to trial, including investigative auditing, evidence gathering and courtroom presentations.

Presenting Evidence

The manual will catalog forensic techniques for analyzing documentary and magnetic media evidence and discuss methods of evidence handling. There will also be a chapter on "how to successfully present credible evidence in court, as an expert witness or investigator, in ways that a jury unfamiliar with computers can comprehend."

An update service is planned to provide purchasers of the manual with additional or revised materials.

The manual will cost $100 after Feb. 1, but it is being offered through January at a prepublication price of $75. The update service fee is $50 annually, *Assets Protection* said from P.O. Box 5327, Madison, Wis. 53706.

Eight States Get Funding for Education Data

Washington Update

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The National Center for Education Statistics of the Department of Health, Education and Welfare has awarded eight grants totaling $407,726 to state education agencies to improve their long-term capabilities to collect, process, analyze or report statistical data about education.

The activities supported through the grants will include combining various components of education data (financial, students and staff, for example) into one integrated data base and upgrading DP expertise, related software and equipment.

The eight states that received grants were Arizona, California, Georgia, Illinois, Missouri, Montana, Nebraska and Nevada.

Babione to Make Acquisition Policy

Dale R. Babione, former deputy-assistant secretary of the Defense Department, has been named assistant administrator for acquisition policy at the General Services Administration (GSA).

The Office of Acquisition Policy (OAP) was established in September to tighten up "decentralized and loosely coordinated" GSA procurement practices, according to GSA Administtator Jay Solomon.

Babione's office will be the GSA's primary point of contact with the Office of Federal Procurement Policy in the Office of Management and Budget.

Babione's office will have four major directorates:

- Acquisitions Policy, headed by Bertrand G. Berube, former director of projects management in the GSA's Public Building Service,
- Contractor Clearance, headed by Harold Scheller, former head of contract clearance for the Defense Department's Logistics Agency.
- Planning and Acquisition Review, headed by Peter Kayafus, previously with the U.S. Air Force Systems Command.
- Federal Procurement Regulations, headed by Philip J. Read, former head of the GSA's federal procurement regulations staff.

The APO will be the focal point in GSA for, among other things, developing and implementing acquisition policies, regulations, systems, procedures and practices; approving preaward contract clearances; establsihing major GSA acquisition goals and objectives; and administering federal procurement regulations.

OTA Picks Barney To Head Division

Dr. Gerald O. Barney has been appointed assistant director of the Office of Technology Assessment (OTA) to head its Science, Information and Transportation Division.

A physicist with the Rockefeller Brothers Fund, Barney is currently heading a study for the President's Council on Environmental Quality. He will join OTA on Jan. 1, after completing that assignments.

The OTA division Barney will head undertakes assessments for Congress on R&D policies and priorities, telecommunications, national information systems, space applications, transportation and certain environmental issues.

Emergency Plan Set For Communications

The Defense Civil Preparedness Agency (DCPA) has announced a program to create an Emergency Satellite Communications System (ESCS) to provide quick communications in times of major disaster.

"The new system would apply modern satellite technology to solving problems arising from destruction or lack of conventional communications after a disaster occurs," the DCPA explained.

Under the program, transportable ground stations with voice, data and television capabilities would be flown or trucked into a disaster area to establish communications via satellite.

The emergency system will consist of a satellite link covering all 50 states, Puerto Rico and the Virgin Islands; a network operations control center in Washington, D.C.; 62 leased, fixed ground terminals with multiple voice, data and television capabilities; and 62 leased, portable earth stations with a single-channel voice or data capability.

The fixed and portable terminals will be distributed to the capitals of each state, Puerto Rico, the Virgin Islands and 10 regional federal offices.

Because the communications technology already exists, the system can be set up at a "modest cost," estimated at about $4 million a year for the first five years, DCPA said. The ESCS is expected to go into service sometime in 1980 or 1981 under the control of the Federal Emergency Management Agency, which is to be established early next year.

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'Slot Machine' Pays Off for Language Students

By Ann Dooley
CW Staff

CAMBRIDGE, Mass. — A new kind of slot machine has been paying off big — but in terms of foreign language learning, not money. The Sound-Synchronized Learner-Operated Teaching Machine (Slot Machine) has recently been developed to employ a mixture of synchronized text and sound as well as animated cartoon graphics to help the student learn more quickly and easily.

The teaching aid was developed at MIT's Architecture Machine Group by Brian and Eva Schwartz, a husband-wife team, while the couple was on leave from positions in Israel. They now live in Baltimore, where he is a systems engineer with Data General Corp. and she, a linguistics expert, is employed by the Baltimore school system.

The system uses both raster-scan color graphics and a random-access sound library under the control of two Interdata Model 7/32 minicomputers and can permit user interaction with the audio-visual material, according to Brian Schwartz.

Hebrew and Russian

The Slot Machine has been programmed to instruct students in either Hebrew or Russian. These two languages were selected because of Eva Schwartz's familiarity with them and because they demonstrate the full capability of the system.

Programming those two languages was no more difficult than it would have been with any others, according to Brian Schwartz, who noted that the most difficult part was working with the character sets that make up the Russian and Hebrew alphabet. The sets had to be defined and then input using an interactive system. The characters were put together by compiling dots in an 8 by 10 dot matrix.

Words can be shown in either left-to-right or right-to-left sequence, depending on the language, Schwartz said.

Words are presently translated into English but the system can be used to translate any language into any other, according to the developers.

To operate the system, a student sits at a Ramtek Corp. Model 9300 raster-scan terminal and uses a movable device that contains a special response button and controls an electronic pointer on the CRT screen. The pointer's screen position along with pushes on the button indicate commands to be carried out for instructions such as "repeat sentence," "translate word," "translate sentence," "repeat word," and "proceed on to a new frame."

Each new frame begins with an audio-visual presentation of a sentence, after which the student is allowed to work with the sentence, words and picture image on the screen. The sentence describes the picture either in Hebrew or Russian.

The words of the sentence appear and are heard syllable by syllable, and the student can make the system repeat the sentence or specific words as often as he likes. Each time, sound and text images are exactly synchronized and access is almost immediate, according to Schwartz. The student can have the word or sentence repeated by either pointing to it on the screen or by pressing the control button.

Using either method, the student can also indicate a word or sentence he wants translated, and the English equivalent will immediately appear for any of the objects or words on the screen. In this way, he builds up associations between spoken words and objects, Schwartz said.

Animated Games

Animated games that teach language concepts are included in other lesson frames. For instance, one frame contains a picture of a slot machine. When the student points to the handle and presses down on the control button, the slot machine's wheels, which contain pictures of various fruits, a bell and a bar, begin rotating, Schwartz said. As each wheel stops on an object, the student hears the foreign word for it, and if the machine's three wheels come up with the same object, such as three lemons, the student is rewarded with the sounds of bells, whistles and dropping money, while flashing red lights appear on the face of the machine.

The medium of games and animation allows the learner to become very involved in the exercises and to pick up the basic vocabulary quickly, according to Schwartz. In addition, by allowing constant user interaction with material and easy repetition of individual words, the Slot Machine offers more help to the student than the standard aids to foreign language instruction, he claimed.

The system is similar to Control Data Corp.'s Plato learning system, which has proven to be very successful, Schwartz noted. The major difference between the two is that Plato is only programmed for the English language and learning within that language and that it is based on a larger hardware system. The Slot Machine can be developed much more cheaply, since it uses minicomputers, he pointed out.

The Slot Machine system with 64K of memory is centered around the two parallel processing Interdata 7/32 minicomputers. These machines handle the tasks of sound generation, video graphics, text generation and user interaction. The 7/32s also keep the audio-visual presentation synchronized by communicating with each other across a memory-to-memory I/O bus.

All sounds are digitally recorded on an IBM 2314-type magnetic disk with a capacity for a vocabulary of about 1,000 words. The system now has a 300-word vocabulary.

The user interfaces to the system via a Summagraphics Corp. digitizing tablet and pushbutton control. The system uses a PL/I with some Assembler and runs under an operating system called Magic 5, which was developed at MIT.

Although the system is still undergoing testing and experimentation, Schwartz contends it will be an important tool for teaching foreign languages to students of all ages.

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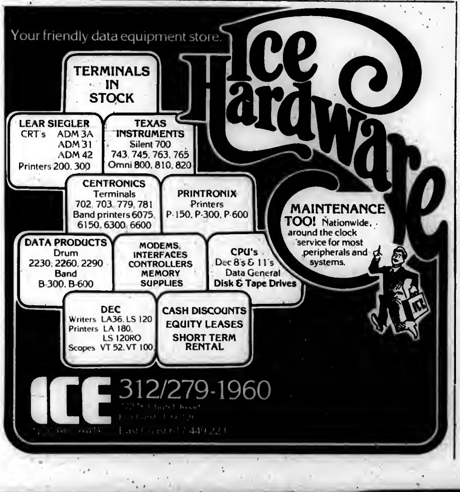
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SYSTEMS TECHNOLOGY SYMPOSIUM, National Bureau of Standards, May 17, 1979

Papers are now being solicited for the "Trends and Applications 1979: Advances in Systems Technology" symposium. The program committee is interested in advanced developments in the following areas: advanced computer architecture, distributed processing, micros in consumer products, office systems technology, networking technology, embedded micros and security from a systems viewpoint. Papers dealing with evolving applications for advanced computer systems technology or the societal impact of such new technology will also be welcomed.

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And Help Cut $500,000 Deficit

On-Line System to Speed City's Water Billing

By Marguerite Zientara
CW Staff

JACKSON, Miss. — In an effort to reduce an "extremely high" budget deficit stemming from unpaid and overdue water bills, the City of Jackson Water Department will soon switch from a batch to an on-line system for its meter reading and billing systems.

Although the deficit has been estimated at more than $500,000, Water Department Director Kirby Bowron said that figure represents both water and sewerage charges as well as some bills that are too old to be collectible.

"We're in the middle of an audit to arrive at an accurate figure so we can clean it up and write some of it off," he said.

The department's troubles stemmed from its previous virtually manual billing system, combined with a 75-day lag between the date a bill was issued and the date it was due, Bowron explained.

Former Collection Method

Under the old system, meter readers went out in the field and brought back the results on mark-sense cards, according to Bill Hazelwood, city DP manager.

After the Water Department checked the cards for irregularities, it sent them to the city's DP center, which ran edits and then returned the cards to the Water Department for another look. Finally, customers were billed, Hazelwood said.

"The problem was, we were billing about 60 days after the meters were read," Hazelwood said.

Terminals for the new system, to be implemented in two phases, went on-line Oct. 2 for processing "everything from new applications and service orders to the billing itself," Bowron said.

Although the meter readings are now entered directly into the CPU via the terminals, if there is any question on a bill, it is "kicked out" and the department must send someone out to reread the meter.

Phase II of the new system, scheduled for next spring, will put walkie-talkies into the hands of meter readers so they can communicate directly with terminal operators back at the office, Bowron said.

If a particular meter's reading indicates usage very different from usual, the computer will reject the reading and send a message to the terminal operator immediately so the meter reader can confirm it or reread the meter, Hazelwood explained.

"With the new system, the guy is standing right there and he can read it again right away," Hazelwood said.

Since the data will be entered into the system right after the meter is read, the bill will be printed the next day. Consequently, customers will receive their bills about three days after the reading instead of 60 or more days later, as they do now, Hazelwood said.

Department's Goals

The goals of the system are an improved cash flow, a reduction in accounts receivable, improved speed and accuracy, Bowron said.

In addition to the technological improvements, he said, there will be a 30-day maximum lag before the bill falls due, instead of the present 75-day lag.

"With the system, it will be easier to spot delinquent payments through the reporting and management tools the system provides," Bowron noted, "so we will have better control over such delinquencies."

The Water Department ties into the city's computer, which is also used by other city departments.

The city now uses a 400K-byte Honeywell Inc. Model 2050A with six tapes and seven disks, each with a 60M-byte capacity, Hazelwood noted.

The present system also includes a Honeywell Model 122-3, 900 line/min printer and a Model 122-4, 1,100 line/min printer, Hazelwood said.

While the Water Department has been using the computer system for printing reports, its meter reading and billing systems have been done manually, until recently, according to Bowron.

While the department went on-line to the 2050A in October, a Honeywell Model 6605 will replace the 2050A in about two months, according to Hazelwood.

The 6605 has 1M byte of main memory and will connect to two Honeywell TRU 1200 printers, operating at 1,200 line/min, he noted.

Of 22 new terminals for the city, nine belong to the Water Department, Hazelwood said. Along with those nine Racal-Milgo System 40 terminals, the Water Department will have three Racal-Milgo 30 line/min Model 20 remote printers, he explained.

The city's new system will also have six disks, three with 100M bytes of memory and three with 200M bytes, Hazelwood said. There will also be six tapes, a card reader and card punch.

A Honeywell Model 6624 front-end minicomputer with 64K of memory will run all the terminals hooked to the system.

The terminals in other city departments will be Honeywell Model 7700s, Hazelwood said.

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Managers on the Move

KERWIN C. NAILOR has been appointed an officer of the Penn Mutual Life Insurance Co. in Philadelphia.

Nailor, who has been with Penn since 1965, is manager of DP auditing, responsible for staffing and directing the company's DP auditing program. This includes reviewing new and existing systems and auditing other computer operations.

The Broomall, Penn, native is a 1970 graduate of Villanova University.

• • •

DR. ALBERT MEYER has been appointed associate director of the Laboratory for Computer Science at MIT.

Meyer is a professor of computer science and engineering in the Department of Electrical Engineering and Computer Science. An MIT faculty member since 1976, he was appointed professor in 1975. Meyer is a graduate of Harvard. He has authored more than 40 technical papers.

Nailor

Dycus

Mistretta

JAMES G. DYCUS and FREDERICK A. MISTRETTA have been named assistant vice-presidents of the Trust Co. of Georgia. Both are assigned to Trusco Data Systems, the holding company's statewide DP organization.

Dycus has been with Trust Co. of Georgia since 1969, when he started as a computer trainee. Appointed an operations officer in 1976, he works in operations.

Mistretta, who works in systems and programming, joined the holding company in 1973 as a programmer/-analyst. In 1976, he was appointed a systems officer.

• • •

ROBERT W. RAUSCHER has been promoted to assistant vice-president of HDR Systems, Inc. of Omaha, Neb.

Rauscher will serve as management informations systems director and handle all computer applications for the computer systems company.

A graduate of the University of Colorado at Boulder, Rauscher has a masters degree in mathematics. He has been a senior consultant at HDR Systems since 1974.

• • •

LARRY R. ELLIOTT, DANIEL L. HERRYGERS and LESLIE L. NEUMEISTER have been named to management positions at GTE Data Services (GTEDS).

Elliott has been named division operations manager at GTEDS' Muskegon (Mich.) Data Center. He is responsible for completing all I/O requirements of the data center, as well as directing operations activities.

Elliott began at GTE as a programmer at General Telephone of Indiana in 1967 and transferred to GTEDS in 1969.

Herrygers has assumed the post of division systems manager at the Muskegon Data Center. The Hart, Mich., native graduated from Ferris State College in Big Rapids, Mich., in 1972, when he began working at GTEDS as a computer operator.

Herrygers is responsible for coordinating all systems and programming activities.

Neumeister, formerly operations staff director at GTEDS' Network and Engineering Group, has been named general manager of network services. The Phi Beta Kappa graduate of Duke University received an A.B. degree in economics.

Neumeister started in data processing when he joined IBM in 1956. He has held a number of positions at GTE since 1960 and has been operations staff director since 1974.

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Professor at Kent State Using Mainframe to Trace Dutch Migration to U.S.

By Marguerite Zientara
CW Staff

KENT, Ohio — In a project that would be "impossible" without the aid of a computer, a history professor at Kent State University here is tracing the migratory movements of 55,000 Dutch from The Netherlands to America between 1820 and 1880.

Dr. Robert P. Swierenga, who has been working on the project for 12 years, hopes to determine whether specific migratory patterns are possibly dependent on variables like sex, occupation and religious affiliation of the U.S. immigrants.

"Computers let me look at civilization from the bottom up," Swierenga said. "We can deal with all the very ordinary people instead of just the very famous."

Swierenga's interest in the project started in 1967, when he was teaching at Calvin College in Grand Rapids, Mich. He "stumbled across" microfilmed records there from the National Archives of The Netherlands. These records tracked emigrations from Dutch municipalities — comparable to U.S. counties — to anywhere in the world.

Trip to The Netherlands

Swierenga, who is third-generation Dutch, became interested enough in the emigration records to transpose them into machine-readable form. But since they were not complete, Swierenga traveled to The Netherlands in 1976 under a Fulbright Scholarship to collect more records about the 20,000 Dutch families who emigrated to the U.S. in the 60-year period.

By visiting 11 regional archives and many municipal archives in The Netherlands, Swierenga found 2,500 to 3,000 more names of Dutch people who emigrated from The Netherlands to America prior to 1848.

The second stage of Swierenga's data gathering led him to review 100,000 U.S. National Archives' passenger lists from ships that arrived in the U.S. between 1820 and 1880. With one to three students aiding him at any one time, Swierenga manually checked these lists for Dutch immigrants.

The lists contain such information as the immigrant's name, age, sex and occupation and the ship's ports of embarkation, and debarkation.

Nine years later, the task was complete and Swierenga moved on to his third set of data, population census lists from the U.S. Census Bureau covering the years 1850 to 1880. "If there were more than 100 Dutch in a U.S. county by 1880," he said, "I added the name of the county to a list. Now I'm going through the microfilm culling the names of all the Dutch-born families."

More Work Ahead

Although Swierenga foresees three to five more years of work on the project, historians have already benefited from his work. A dozen libraries and associations have paid for computer time to get duplicates of an alphabetized list of 55,000 Dutch immigrants that he produced using the computer.

Besides the alphabetical listings, Swierenga has run computations on his data to produce some preliminary conclusions. "The main things I've found are that 80% of the Dutch people migrated as families, a higher percentage, I think, than any other Northern European immigrant group, and roughly 80% of the immigrants were from rural communities in The Netherlands," he said.

Ninety percent of the Dutch immigrants Swierenga has studied come to the U.S. as opposed to other countries, he noted, adding that is "a very high figure." They were interested in farmland and headed for the Midwest, seldom remaining in U.S. cities.

"It was not a famine migration, like the Irish, when the people were trapped in Boston and couldn't afford to go inland," Swierenga explained. "Most of these people could afford to buy land."

His computations have also shown that more than 80% of the immigrants arrived in New York City, usually traveled along the Erie Canal and settled in western Michigan, southern Wisconsin, northern Illinois and Iowa.

Future Goals

When his research is complete, Swierenga hopes to have analyzed Dutch migration patterns in light of more than 40 variables. He will study the Dutch municipalities in terms of their population size, density and growth rates, sex ratios, religious configurations and occupational data.

In addition, Swierenga will consider the number of people who were born in a Dutch municipality and who are still there, the number of people who were born elsewhere and then moved to The Netherlands, as well as tax data indicating the wealth of the land and agricultural data showing the nature of the farming that went on.

"I want to try to explain the variation in the out-migration rate," he explained. "I'd like to see if, for example, the agricultural makeup or religion, or a combination of variables, might be an explanatory variable."

Swierenga envisions the possible end product of his work as a two-volume book about the "anatomy of Dutch immigration." He hopes eventually to make a point-to-point analysis of the Dutch "from where they originated to where they settled.

"I'm hoping to link as many individual families as possible," Swierenga said, "starting with the Dutch lists indicating their origins, through the ship lists telling the ports they came through and finally with the U.S. Census lists showing where they ended up."

Swierenga used "canned" software from SPSS, Inc. of Chicago for most of his programs and said it is "very easy to use." The package allows him to do most of his recoding and statistical tests easily, he noted. For such programs as the record linkage, however, Swierenga relies on the technical staff at Kent State University.

He uses Kent State's Burroughs Corp. B6700 computer with 1,2M bytes of memory and two printers.

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System Helps People Choose Leisure Activities

By Ann Dooley
CW Staff

MILWAUKEE — The Milwaukee Public School System is using an automated system to determine how individuals should best spend the extra leisure time automation has given them.

Many people don't know how to fill their free time or even what activities are offered in their communities, according to Dr. Joseph Mirenda, adult education administrator for the Milwaukee Public Schools.

To help remedy this situation, the school system developed a leisure counseling model in conjunction with the University of Missouri at Columbia. The model has been in use since 1974 in Milwaukee and is reported to be the only one of its kind.

The leisure model was designed to be used manually or with an automated system, depending on what resources are available to the agency providing the service, Mirenda said. The results are the same in both cases, but it is faster and more efficient to process them by computer.

Adults Only

The leisure model is available only to adults and is composed of three parts: an interest finder, an activities file and an inventory file.

The interest finder is an assessment tool that helps adults discover where their interests lie within a wide range of leisure-time activities. Ninety activity statements are included on the form, and the user rates each on a five-point scale according to his interest in the activity. The rating scale is used to chart the respondent's profile sheet, which gives a graphic representation of interest catagories. Users rate statements concerning activities such as fishing, stamp collecting or playing dominoes.

The activities file consists of complete descriptions of available activities, including requirements for participation, rules, equipment needed, the equipment cost and environmental factors. Also included are the activity's handicap limitations and social and psychological benefits, Mirenda said.

The inventory file consists of information from other sources and includes a variety of agencies, clubs and group activities from within the Milwaukee community. Brochures, catalogs, newspaper clippings and personal contact are some of the sources used for data.

Keeping this information current is a constant problem and, although the material within the system is somewhat dated right now, it will all be updated soon, Mirenda said.

Nine major activity categories are stored in the system, including games, sports, nature, collection, homemaking/homecraft, art and music, educational, entertainment and cultural, volunteer and organizational topics. Each of the nine catagories are further subdivided into specific examples and types. Both the activities and inventory files are coded and cross-referenced into a system of 999 leisure activities.

It was essential to include a wide variety of activities because the school system wanted a model that would accommodate the many individual interpretations of "recreation," Mirenda stated.

Although Milwaukee is the only city presently using the model, it is available to others. If a city or organization doesn't have access to an automated system, a counselor would be needed to manually select those catagories ranked highest in interest by the participant and match them with 15 to 20 leisure activities available in the area.

Where computer capabilities exist, age, sex, occupation and other identifying data on the respondent, as well as the 90 interest responses, are coded for insertion into the system by an optical scanner.

The Milwaukee Public Schools uses a National Computing Systems, Inc. 8K-byte 7010 optical scanner that codes the data onto tape which is then entered into the school department's IBM 370/148 mainframe. The CPU also includes an IBM 1403 printer to provide output for respondents. The program was written in PL/I and runs under DOS/VS.

Once the information is entered into the system, a profile sheet is printed out in minutes. Included on the profile sheet are average scores for each of the nine catagories and subcatagories along with the top four scores of all the catagories represented.

Based on the respondent's high interest areas and any additional criteria he has set, the system will match activities on a citywide basis from the information stored in the system. The respondent is then given the profile sheet and list of activities that includes times, fees, equipment needed and activity sites.

Although vocational counseling preference models have been in operation for some time, little attention has been directed toward leisure modeling, according to Mirenda.

Most of the individuals using the Milwaukee leisure service are persons returning to the mainstream of society, like former drug addicts, alcoholics, prison inmates or those in a halfway or sheltered population.

One alcoholic treatment center has been sending 60 to 65 participants a month to the service so that these people can find fulfilling activities.

The elderly, ill or handicapped are also frequent users, Mirenda said.

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'Very Peculiar Specialty'

Travel Firm Smooths Last-Minute Bookings

By Marguerite Zientara
CW Staff

BOSTON — If fire broke out on a North Sea oil rig, a unique travel agency here could use direct terminal hookups to national airlines and European travel bureaus to speed a fire fighter to the site.

However, Woodside Central's "very peculiar speciality" is more often making short-notice reservations for corporate executives, lawyers and salespeople than helping fight fires, according to Thornton Clark, the agency's executive director.

Woodside makes both long- and short-notice reservations for business travelers from thousands of corporations daily via its direct terminal hookups to 19 airline, hotel and car rental reservation data bases.

At the Summit

Woodside considers itself "the culmination of the travel industry's move toward computer automation" according to Clark. The company, owned by 27 of the world's largest travel agencies, makes two million business travel reservations per year for corporate clients throughout the U.S. and Europe.

For 55% of those itineraries, the initial telephone call to Woodside is not made until the day of departure. "Plans keep changing in a large percentage of business travel, and the final plan isn't developed until the day of or the day before departure," Clark said.

He added that planning ahead with the help of daily computerized reservation statistics enables the agency to make short-notice reservations in the face of airline and hotel space crunches.

"Because we have so many millions of reservations flowing through one central place, we're able to predict our needs," Clark explained. "For example, we can see that in January, when things get tight during the Chicago housewares show, we'll need about 160 rooms every night for a week. We'll negotiate for a block of rooms, commit ourselves to that space and then sell the availability out of our inventory as the names flow into this office."

Centralized Arrangements

Because the 27 independent travel agency owners voted two-years ago to merge all their land arrangement functions into the central reservation office, a San Diego hotel booking for someone in Los Angeles will still go through one of 19 computer systems to the Boston office.

The Boston office employs 36 people and has up to eight terminals for each of the 19 computer systems into which it hooks, "which is what makes the place a zoo," Clark said.

Its terminals are linked directly with the data bases of American Airlines, United Airlines, TWA, Allegheny Airlines, Air France, Pan American Airlines, Hertz Rent-A-Car, Avis Rent-A-Car, National Car Rental and Budget Car Rental.

It also has hookups to Holiday Inn, Hilton, Ramada Inn, Best Western, Howard Johnson's, Western International, Quality Inn, Sheraton and Marriott hotels' data bases.

While the number of direct-access terminals makes the center's work possible, it also makes training complicated because there are keyboard, format and procedural differences for each one of the systems, Clark noted.

High Volume, Low Rates

Besides the ability to make speedy reservations, Woodside Central claims accuracy and lower rates, not typically given to the public, as a result of high volume of corporate transactions.

"Instead of relaying a message to someone at a company's reservation center who doesn't know us or our clients," Clark said, "we are responsible for the accuracy of entering the data directly into its data base. And by having our reservations go directly into the systems, we can be sure we always get the right rate."

The Woodside Group of Travel Agencies, consisting of the 27 agencies, employs 1,400 people in 92 offices in major business centers of the U.S. and Europe. There are 24 offices in Europe, and that number will grow to 50 when a network linking Scandinavia is installed, Clark said.

An agency in Mexico City went online last month, he noted.

The agencies deal with individual clients and relay messages to the Boston office, where terminals of "every different shape and size under the sun," from such firms as Raytheon Co., Harris Corp., Incoterm Corp. and IBM are used for processing, according to Clark.

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Seamen's Log Data May Help Save Whales

By Tim Scannell
CW Staff

PROVIDENCE, R.I. — The yellowed records of 18th and 19th century sea captains listing the details of ancient whaling conquests may hold the key for the future survival of the whale, according to a researcher at Brown University.

Stuart Sherman, a professor of bibliography, is using a computer to catalog the information contained in more than 4,000 logbooks and journals collected from various libraries as well as from the attics and basements of seafarers' descendants. When analyzed, the records may help show that an abundance of whales once roamed the seas and that a present scarcity indicates an impending extinction, Sherman said.

On the basis of the computerized whaling information, the 17-nation International Whaling Commission can decide what species can no longer be commercially sought and can put quotas on the number of whales that may be taken, Sherman said.

"We know that there are fewer whales, based on pretty sketchy facts," the researcher explained, noting that inadequate data on feeding grounds, migration patterns and location at a given time of the year make it impossible to take an accurate census of the whale population.

Logs' Details

The antiquated ships' logs report the date, time and approximate location of the ship when a whale was first sighted or harpooned. "A captain would also keep information on migrations and feeding grounds," Sherman stated, and "every year he would add to what he had learned."

Each journal page, carefully ruled with columns for different categories of information, would also indicate how much oil or flesh a particular mammal yielded. Data such as this, Sherman noted, could be used to compare the size of whales in the past with whales today and possibly pinpoint any noticeable changes in the age distribution or health of the remaining population.

"My job is to try to locate the records that will be of value to [whale] population experts and cetologists who try to estimate the original size of various species some 100 or 150 years ago," Sherman said. "Then, by an examination of these records, we hope to determine how many whales were actually killed and how many were struck and lost. This will give us some idea of the reduction of the herds."

There is no doubt that whales are headed for extinction, according to Sherman. However, the difficulty lies in trying to gather enough evidence to convince the Soviets, the Peruvians and the Japanese that the multitonned victims of their floating fish factories are an endangered species.

Sherman extracts pertinent information from each of the whaling logbooks and edits it in a "uniform, standardized format." The prepared information is then submitted to Brown University's computing lab, where the data is input to a 2M-byte IBM 360/67, via terminal, processed and then transferred to an "archive" disk. The information on the disk is updated each time new journal information is added and used to produce a list which will eventually make up the final inventory Sherman hopes to complete late this spring.

When the archive disk is complete, he continued, the whaling data base can be used for supplements and an occasional total revision of the master list. "In other words, I hope what I produce next spring will not be the last compilation," he said.

The professor's research, which he contends began 30 years ago with the literary chronicles of Herman Melville and an interest in maritime history, is funded by a $3,600 award from the U.S. Marine Mammal Commission.

Time is the greatest enemy to Sherman and to the various "save the whale" organizations working to stave off the mammal's extinction. "About six or eight years ago, around 70,000 whales were taken and that figure has declined every year since," the researcher pointed out. This is "mostly because of the growing nonavailability of the whale," he said.

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Jan. 4-5, Honolulu — **12th Hawaii International Conference on System Sciences.** Contact: Perry G. Patteson, HICSS-12, Office of Management Programs, University of Hawaii, 2404 Maile Way, Honolulu, Hawaii 96822.

Jan. 8-9, Honolulu — **Pacific Telecommunications Conference (PTC '79)**, sponsored by the Communications Society of the Institute of Electrical and Electronics Engineers. Contact: PTC '79, Social Science Research Institute, University of Hawaii, No. 704, 2424 Maile Way, Honolulu, Hawaii 96822.

Jan. 8-10, Boston — **Developing DP Systems for the General Ledger.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Jan. 8-10, Washington, D.C. — **Action Tools for Women Managers.** Contact: Management Resources International, 6621 Electronic Drive, Springfield, Va. 22151.

Jan. 15-18, Atlanta — **Automating and Integrating Purchasing Accounts.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Jan. 16, Costa Mesa, Calif. — **Invitational Computer Conference.** Contact: B.J. Johnson & Associates, No. 203, 2503 Eastbluff Drive, Newport Beach, Calif. 92660.

Jan. 19-20, Hanover, N.H. — **Sixth Annual Conference on Instructional Computing**, sponsored by New England Regional Computing Program (Nercomp). Contact: R. Gibbs, 40 Grove St., Wellesley, Mass. 02181.

Jan. 21-24, Denvery — **Winter Conference of the Optical Character Recognition Users Association.** Contact: OCR Users Association, 10 Banta Place, Hackensack, N.J. 07601.

Jan. 21-27, Chicago — **American Library Association (ALA) Midwinter Meeting.** Contact: ALA, 50 Huron St., Chicago, Ill. 60611.

Jan. 22-26, London — **Computers and Peripherals Trade Show**, sponsored by U.S. Department of Commerce. Contact: E. Belden, U.S. Department of Commerce, Bureau Export Division, Washington, D.C. 20230.

Jan. 22-26, Clearwater Beach, Fla. — **Personnel Productivity in Data Processing**, sponsored by Keston Associates. Contact: Dr. Robert Keston, 11317 Old Club Road, Rockville, Md. 20852.

Jan. 24-26, Phoenix — **Planning a Productivity System.** Contact: Theorem Institute, Suite 590, 1737 N. First St., San Jose, Calif. 95112.

Jan. 24-27, Tokyo — **International Microcomputers/Minicomputers/Microprocessors '79 Japan.** Contact: ISCM Ltd., 222 W. Adams St., Chicago, Ill. 60606.

Jan. 29-31, Washington, D.C. — **What Managers Ought to Know About Minicomputers.** Contact: Management Resources International, 6621 Electronic Drive, Springfield, Va. 22151.

Jan. 29-Feb. 2, Laguna Beach, Calif. — **How to Develop an Effective Long-Range Data Processing Plan**, sponsored by Keston Associates. Contact: Dr. Robert Keston, 11317 Old Club Road, Rockville, Md. 20852.

Jan. 30-Feb. 1, Washington, D.C. — **Communications Networks Conference & Exposition.** Contact: The Conference Co., Newsroom, 60 Austin St., Newton, Mass. 02160.

Jan. 31-Feb. 2, Houston — **The Data Base Course.** Contact: Management Resources International, 6621 Electronic Drive, Springfield, Va. 22151.

Jan. 31-Feb. 2, Paris — **Third International Seminar — Seminar in Banking**, sponsored by the Institut de Recherche Interbancaire (Insig). Contact: Insig, 5 Rue Quentin Bauchart 75008, Paris, France.

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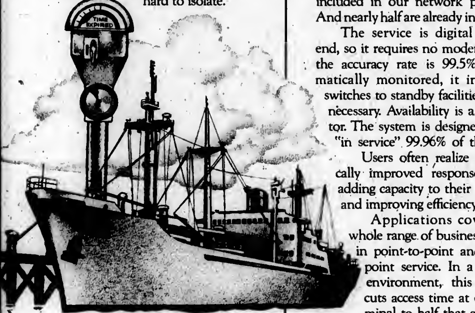

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Editorial

The Need for Redundancy

In recent weeks, memory overloads and component failures in the mainframes used by the Federal Aviation Administration's (FAA) Air Route Traffic Control System have been blamed for traffic delays in the Chicago and New York areas, both of which are among the busiest air traffic regions in the country.

But late arrivals and departures are a manifestation of a more serious problem. They occur because air traffic controllers must assure safe separation of aircraft traveling 500 miles an hour or more, and when it comes to priorities, safety is certainly more important than tight schedules.

During computer failures like this, the data block that identifies each blip on a controller's display screen by airline and flight number and also provides its altitude and airspeed is no longer printed out next to the blip and controllers must quickly switch over to the FAA's backup system.

This involves moving the display units from a vertical to a horizontal position and writing the necessary flight data for each aircraft controllers are handling — anywhere from one to 20 — on a plastic chip and placing that chip next to the blip on the now-horizontal radar screen.

They then update this data from information supplied by voice communication with pilots.

This backup system of air traffic control uses broadband radar rather than radar tied in with computerized displays. This broadband system was employed for many years in even the busiest locales in the U.S. and is still used in many parts of the U.S. and the world. It is a system the FAA staunchly defends.

The FAA contends that skilled controllers can operate both systems and even a third far more rudimentary one that relies completely on radio information prescribed by FAA procedures manuals for situations when even the radar systems go down.

However, many people believe the transition from one system to the other is a scramble and constitutes a hazard to flight safety.

Controllers being recruited and trained by the FAA today get limited training in broadband control. Many have said it is inferior to the computer-assisted method now in use — as long as that computer-assisted system is working. But it's not 100% reliable. Reports from controllers cite sporadic difficulties that frequently occur when software patches are implemented.

This discussion boils down to one point, however, and that is the critical need for system reliability and redundancy.

It's one thing for a system to go down in the middle of a payroll run. It's quite another when a system being used to ensure the safety of hundreds of airline passengers ceases to provide necessary data.

As more computerized systems are utilized for health and safety applications — such as controlling life support systems in space capsules and heart monitors in hospitals — as well as air traffic control, failsafe systems become critical.

These surely are cases in which redundancy — yes, duplicate systems sitting idle *until they are needed* — is absolutely justified. And any argument about the cost is irrelevant.

How can the FAA put a price tag on the people aboard a 747, a Lear Jet or even a Piper Cub — to say nothing of any people on the ground — who might be injured or killed if an accident occurs?

Data Past

Five Years Ago
Dec. 5, 1973

NEWTON, Mass. — The majority of DP managers remained indifferent to the effect a major energy crisis might have on their shops, according to a Computer*world* survey. Eighty-three percent said they had not set, or given any thought to setting, priorities on their job runs. Sixty-seven percent of those interviewed had not made any provisions for back-up in the event of brownouts or blackouts.

— — —

PHOENIX — A national law enforcement communications network that was scheduled to begin operations on Christmas Eve would eventually tie all the nation's motor vehicle records into one on-line data base. The National Law Enforcement Teletype System would initially be a store-and-forward message-switching connection between the states' police agencies.

Eight Years Ago.
Dec. 9, 1970

Police detectives and crime commission investigators reported the Mafia had been using computers for success in the numbers racket. According to a DP analyst, the loss potential of numbers could be predicted from a "characteristic" trend in betting determined by the computer from an analysis of placed bets, winning numbers, percentages of payoffs and types of numbers used.

— — —

MINEOLA, N.Y. — The First National City Bank's computer here was credited with smashing an organized ring of credit card thieves and recovering 167 stolen cards, after several New York banks lost about $500,000 to the ring. At least three persons were arrested as a result of a five-week investigation, started after the bank's computer pinpointed one merchant's unusually high credit transaction rate.

Letters to the Editor

Product Not a First

I believe an erroneous statement was made about Cullinane Corp.'s VM/CMS version of IDMS being the first commercially available data base management system (DBMS) to run in the VM environment [CW, Nov. 13].

A quick review of the International Computer Programs (ICP) or Datapro Research Corp. software directories indicates several other DBMS operate in the VM environment.

These include our own Focus, System 2000 from MRI Systems Corp. and Total from Cincom Systems, Inc., to name a few.

David R. Kemler
Director of Marketing
Information Builders, Inc.
New York, N.Y.

In Defense of Fellow DPers

I can't count the number of times I intended to write a letter like this but never got around to it. After reading the "Human Connection" articles by Jack Stone and Joan Hendrickson [CW, Nov. 13, Nov. 20] I'm finally going to follow through.

I'm doing this primarily to defend my associates against many of the rather generalized assertions in the articles and secondarily to avoid any "passive characteristics when dealing in special social situations."

The authors imply that DPers take an excessively long time to analyze and answer a question such as "What are you truly looking for in a relationship?" Well, this isn't like asking someone, "Do you have change for a five?"

The articles went on to point out the "dead personalities" and "lack of the wonderful spontaneity that makes life so exciting." Hendrickson should have been with me the day I informed the supervisor of operations that an eight-hour Saturday run was worthless because of a user's input error.

I also recall the time just prior to program installation that I told a programmer for the seventh time the user wanted a change. His face "became alive," his "voice strengthened," his "gestures became more animated", what followed is not fit for publication. We're still looking for the rest of the source deck.

Regarding the statement that "DPers are the least trustful of all of our clients," Hendrickson obviously doesn't handle any auditors. They may be the group that "needs help dealing with others in a feeling kind of way."

I don't pretend to be an expert on human behavior, but my experience with DP people has proved them to be as emotional, compassionate and human as any other group. A lack or abundance of warmth and feeling is a personal characteristic and not attributable to a profession.

And in answer to Hendrickson's question concerning the success of computer people in the business world — yes, we are.

Mickey Charlton
Solon, Ohio

Disturbed on Three Counts

With regard to "Report Finds Causes for Colleges' System Bugs" [CW, Nov. 13], I cannot decide if the most disturbing aspect is that:

1. The Vermont State Colleges would commission a one-day study and expect any meaningful diagnosis and/or recommendations to result.

2. Any reputable consulting firm would purport to be capable of performing a one-day study of any value and would, in fact, accept such an undertaking.

or 3. By reporting on it in Computer*world* and repeating the ridiculous statements and conclusions made by both parties, CW lends credence to such efforts.

Herbert S. Lunenfeld
Rockville, Md.

(Other letters on Page 24)

The Human Connection

DP Free-Lancing Expands Jobs for Women

By Jack Stone
And Ida Mason
Special to CW

As we have traveled around the country, talking with DP societies and organizations, it has become evident that women are assuming major roles in the development of the information systems business — and in all areas, ranging from technological research to machine operations in the production center.

Although men still hold the majority of top management positions, women have met with considerably less prejudice and more equality in DP than in most other fields. And it may be that an organization operating in England and planning to expand to the U.S. will provide major new opportunities for women in the DP community.

F International is one of the oldest software houses around, with headquarters in Buckinghamshire, England. It was founded in 1962 by "Steve" Shirley, who now serves as a director of the company. The company has grown to about 350 people and conducts operations throughout the British Isles and Scandinavia.

The fact that Shirley had had her own first child about the time she organized the firm encouraged her to create an environment in which women with children could work on a free-lance basis. Although the company was established to accommodate working mothers and their family situation, it does not discriminate against men who make up a small but important part of the personnel complement.

It is interesting to speculate on how this "organized free-lancing" might operate in the U.S.

Enough Interested?

First, are enough women here interested in free-lance systems development? Well, there certainly were plenty to go around for F International, but we wonder if American women at home with the kids really want to handle a part-time systems job or would rather wait until they can work full-time for a more conventional firm.

Second, are available women qualified? At F International, each consultant, analyst and programmer is perceived to be highly skilled, having an average of 10 years' experience as a consultant or denizen of a computer center. Minimum entry requirements include three to five years of training, depending on the assignment.

Can a team of part-time professionals function effectively as a systems team? Project managers are expected to prepare their own proposals for new assignments, keep track of team member productivity and make financial estimates for each job.

Each project manager also has what amounts to operational autonomy and must negotiate contract terms using established guidelines. And the project manager must deploy staff, allocate budget and be accountable for each project through all the development phases.

On the one hand, the challenge is in the job all right, but it may be overwhelming.

Lack of Hierarchy

Will the lack of an established corporate hierarchy be an advantage or disadvantage to the team member? Project leaders are chosen only for the duration of a particular project. The part-timers are continually shuffled between projects and handle many changing roles and responsibilities. The swim of tasks could be viewed as exciting to some and unsettling to others.

Will American information systems departments respond positively to free-lance software firms? This style, known as "cottage industry" abroad, has been long accepted in many other countries, but here it would be considered an unusual way of doing things, at least for the larger computer centers who probably view such operations as a bit too fragile, particularly for long-term dealings. But there is still a large volume of business activity with the small vendors. (It is rumored that every family in Silicon Valley with a garage is building an intelligent terminal!)

Well, we're not going to forecast that the organization concept will really work here or not. We are fairly confident that there are those negativists who would grumble that if it gets under way at all, it would soon yield to the American business pressures to become just another "ho-hum" software house.

But we know for sure that it's an interesting idea, and if it works, it could certainly supply both a partial answer to the current crushing demand for DP personnel and a new outlet for the talents of many women members of the industry.

Ida Mason is a professor of DP at Lehigh County Community College, Schnecksville, Pa., who frequently writes and lectures on the subject of women in management.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

The Taylor Report

Two Problems Behind Detroit System Failure

By Alan Taylor
Special to CW

It is now unquestioned, four years after its inception, that Detroit's Financial Information and Control System (Fics) — provided by Arthur Andersen & Co. — has technical failures [Taylor Report, Oct. 30]. Local and national newspapers have mentioned it, and, in a report to the city council, Detroit's auditor-general cited "contract provisions that were not complied with" and called for an investigation this past Aug. 23.

Departments keep two sets of books — one to work from and one to keep Fics running — and users claim the contractor didn't ask about or listen to their ideas on the needs of the system.

Certain unresolved details remain. For instance, did the city know it would get a hand-me-down version of a state, not city, financial system from Louisiana?

The observance of one important technical principle and different treatment of technical personnel would have either avoided the problems, or at least avoided an 18-month delay in starting the investigation.

Let's look at these problems. The technical principle concerns the true meaning of "Gigo" in a system analysis environment, and the personnel issue involves a technician who "blew the whistle."

'Gigo' Unappreciated

Gigo (for "garbage in, garbage out") is more than a computer person's excuse for bad computer output. Arthur Andersen and the city of Detroit failed to appreciate its importance as a systems analyst's tool for reviewing computer output.

As he looks at the input formats or file designs an analyst can see what is going to be wrong. A file that only has room for a single, current balance per account, for instance, tells a systems person that checking accuracy in the light of possible misreads or miswrites will be difficult, even impossible.

If he then finds no one knows *how* to do such checking, he can quite properly condemn the whole system.

In May 1977, Detroit's auditor-general recommended against investigating Fics because of an anticipated cost of $50,000 (which apparently came from another auditor management services supplier). This has cost Detroit an 18-month delay in facing up to contractual failures.

It doesn't cost $50,000 to check

(Continued on *Page 26*)

Reader Commentary

Long Zip Means More Than Coding Changes

By Roger M. Loeb
Special to CW

Recent articles and an editorial in *Computerworld* regarding the implementation of the nine-digit Zip Code have concentrated on the type and extent of program modifications that will be required [CW, Oct. 2, 9]. While there is no doubt that virtually every mailing system program, file and print format will require some form of revision, the extended Zip Code also has significant implications in overall systems logic.

At the present time, addressees provide their correct Zip Code in more than 92% of the cases. As a result, most systems that utilize name and address information accept the Zip Code as provided and validate it with only a minor amount of editing.

But since the extended Zip Code will be optional for individuals, it is suspected that the correct nine-digit Zip Code will be received from less than half of the addressees.

Now, invalid Zip Codes can be looked up in the POD 65 directory, which is approximately the size of a large telephone book. The directories required to look up an extended Zip Code would represent a stack of books several feet high and would be very difficult to handle manually.

Although there are computerized directory lookup systems for the assignment of the five-digit Zip Code, the cost of these systems has usually precluded extensive use, particularly since the present Zip Code is provided by the addressee with reasonable accuracy.

In order to ensure the integrity of the extended Zip Code, it will probably be necessary to develop computerized directory search systems covering the entire U.S. at the block face level. The size of this computerized directory will preclude its general use on many of the small computers being marketed today.

As a result, the small businesses using minicomputers and small general-purpose computers will be faced with the difficult choice of manual Zip Code lookup or the cost of software and direct-access storage for the computerized directory. Either choice will result in a significant increase in expense to these organizations.

In addition to the economic incentives that will be offered to business mailers for the use of the extended Zip Code, there appear to be some benefits to offset the additional processing costs. If

(Continued on *Page 24*)

Letters to the Editor

Sell the Steak, Not the Sizzle

I am writing in response to "Stress Product Image, Software Vendors Told" [CW, Nov. 13]. Robert Randolph's message was that software vendors should concentrate their marketing efforts on the product image rather than technical capabilities. Suggestions included spending money on promotion rather than enhancements and bringing documentation down to the eighth-grade level. Translation: "Sell the sizzle, not the steak."

This marketing strategy is the same one that caused domestic auto manufacturers to lose the allegiance of the millions of Americans who want economical transportation. The Europeans and Japanese were ready with the product and the facts.

I am involved in my fourth software evaluation (a data base management system). The vendors who have impressed me knew the software internals and could answer technical questions without fumbling. My advice to the software industry is to forget the sizzle and sell the steak.

Steven Teeter

Campbell, Calif.

Column Incomplete

Alan Taylor's Oct. 30 column made several unfair allegations against the city of Detroit, Dennis O. Green, the former finance director, Marie Farrell-Donaldson, the auditor general, and the accounting firm of Arthur Andersen & Co. The article failed to include pertinent facts that would have provided readers with knowledge of the high integrity of Green and Farrell-Donaldson and the excellent computerized systems installed by the city with Arthur Andersen's assistance.

The article failed to report that Arthur Andersen was selected for the consulting work in the city through the competitive bid process. Because Green had worked for Arthur Andersen prior to his 1973 appointment, he excluded himself from the five-member committee that screened proposals from eight firms before selecting an accounting consultant to assist the city. The consultant's contracts were approved by the City Council and the systems discussed in the column have been installed and are very effective in helping us monitor our fiscal position.

Farrell-Donaldson is an independent and qualified city auditor general. Her staff closely monitored the design and installation of the city's financial systems and has successfully audited the results.

Detroit has taken a national leadership position in the improvement of its financial and management systems. In fact, Detroit, through Green, was honored by receiving the Silver Medal in the Louisville Award competition in 1976 from the Municipal Finance Officers Association, for the development and implementation of the financial information system Taylor is now criticizing.

Paul R. Thompson Jr.
Director

Finance Department
Detroit, Mich.

Code to Have Other Effects

(Continued from Poge 23)

the Integrity of the nine-digit Zip Code can be assured, either through manual or computerized directory search, then the extended code can be used as a major file sequence.

Because a nine-digit Zip Code covers only two facing block faces — i.e., both sides of the street for one block — the density of names and addresses within that code will be very small. This will significantly reduce the complexity of some of the design problems encountered in computerized file matching.

The extended Zip Code will also make possible the application of detailed census data demographics to computerized files. Although census data is presently available by Zip Code, the five-digit Zip Code does not represent a very homogeneous group of people and, therefore, the data is of questionable value. The very small territory defined by a nine-digit Zip Code is almost certain to be quite homogeneous, and the associated census data will, therefore, be capable of discriminating socioeconomic variation.

Revolution in Direct Mail

The availability of detailed data at this level will revolutionize the direct mail industry and will provide customer research data for most other businesses.

The implications of the extended Zip Code are therefore much broader than the programming problems that will be encountered in modifying existing systems. Some systems will need to be redesigned, while others will take on entirely new characteristics and will be forced to meet sophisticated new requirements.

Although some delay is to be advised until the implementation of the extended Zip Code is better understood, the magnitude of the changes that will be required in most systems is great enough that procrastination could prove quite expensive.

Loeb is with Neodota Services of Boulder, Colo.

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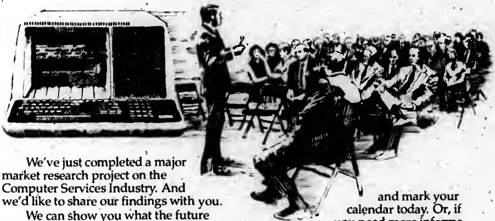

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Two Problems Contributed to Failures

(Continued from Page 23)

out a complaint or two when failure to comply with a contract is evident. If Detroit had checked the complaints the auditor-general knew about in January 1977, a lot of trouble could have been avoided and much money could have been saved.

Martyred Whistle Blower

The second problem, the personnel issue, concerns the impact of a martyred whistle blower on an organization setting out to implement a system. The victim in the Detroit situation is a senior systems analyst who caught the problems while matters were still at the proposal stage. He was subsequently fired.

This occurred so quickly and forcefully that before the users knew enough about the system to object to it, their technical personnel were shown — in no uncertain terms — what would happen if they asked awkward questions.

The analyst concerned was Stuart Egan. In June 1973, he was given the job of working with Arthur Andersen to collect needed user data. Three months later, before the management overview report was published and the departments were told what was in store, Egan was returned to the city as "incompetent."

He was subsequently fired in 1975, won reinstatement, was fired again and is still involved in a running battle to protect his name and the city's interests.

Employee Evaluation

Arthur Andersen's evaluation of Egan shows more about how the firm evaluates its own professional staff than about Egan's three-month stint with the firm in 1974.

In the evaluation, professional and personal attributes are grouped together in an 18-point section. Qualifications included in the list are winning confidence of clients, ability to follow instructions, knowing when to compromise without sacrificing principles, leadership capability and capacity for teamwork.

Other items are perception of need for additional client services, aptitude for associating with others, appearance and poise, tact and common sense, willingness to accept responsibility, initiative and cooperation. The remaining qualifications include ability to perform under pressure, decisiveness, self-confidence, attitude, maturity and integrity, which includes "frankness" when dealing with others."

Independence, the crux of professional responsibility, is not mentioned. The closest thing to it is the very last point at the end of the list, integrity.

Many of the professional points listed such as skill at teamwork, ability to follow instructions, getting along with clients and marketing ability are in direct contrast to the capacity to stand up and maintain professional independence.

Note the stress on deferring to others, to clients, supervisors and so forth. This emphasis may result in professional "yes men" unable to stop the implementation of questionable projects.

News Got Around

After Egan was kicked out by Arthur Andersen, the news got around. He had been known in city circles as the "only competent person knowledgeable in all aspects of the [city's] accounting procedures." He had worked with the user departments for years.

If Egan could be discarded so quickly, how could other persons, particularly users, risk more than token opposition?

As I see it, Egan's firing has served as a smokescreen behind which Arthur Andersen can hide from questions about its 1973 activities.

The firm said Egan's charges had been found by the Federal Bureau of Investigation to be "without foundation," when the FBI specified that it had only looked into federal violations. Furthermore, Arthur Andersen described Egan as an "ex-employee" and asked for "skepticism," before his charges were even considered before the public.

Arthur Andersen and the city of Detroit failed to appreciate the importance of Gigo and also failed to supply technical personnel policies to encourage professional independence. When a computerized system is introduced into this kind of environment, downstream problems are invited.

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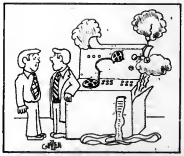

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Potomac Peddler Ponders Puzzle

By Don Leavitt
CW Staff

McLEAN, Va. — IBM-oriented installations that can buy from the Federal Supply Schedule are a puzzle to one of the vendors on the list: Few seem to realize the vendor has a software package it will give them for the asking.

The vendor is Pansophic Systems, Inc., and the package is Panvalet, the source statement library system that works under DOS, OS or VS on IBM 360 and 370 or compatible CPUs. Panvalet has earned a place on Datapro Research Corp.'s Software Honor Roll for several years.

For the past 10 months or so, qualified agencies haven't even had to pay for the software, yet Pansophic has given away very few copies "and that puzzles me," a spokesman said.

The current situation arose from an agreement signed with the government in the early 1970s, he explained. Under that pact, Pansophic agreed to provide the software free to any other qualified organization once "either X number of copies had been sold at the Schedule cost or sales reached a specified dollar volume; I don't remember which," he said.

In either case, the breakpoint was reached near the beginning of 1978 and Pansophic has been trying to spread the word that Panvalet is now available to any agency that doesn't have it yet — free, no strings attached.

The software being distributed under this plan is the latest version of Panvalet, and installations are provided with six copies of the documentation, "which is more than we normally give our civilian customers," the spokesman noted.

Available to Many

A broad spectrum of installations have the right to acquire items through the Federal Schedule. These include not only federal agencies, but state, county and municipal facilities as well, along with contractors doing work for any of the qualified organizations.

The problem Pansophic has in giving away Panvalet may be that agencies are suspicious of anything that is free, but that really shouldn't be a factor in this case, the spokesman said. Any copies distributed now aren't really free — "They're prepaid," he pointed out.

But government regulations and rules may be a problem, he acknowledged: "Agencies don't like to prepare purchase orders for nothing." When that is the basic hinderance facing an installation, the interested user is urged to contact Pansophic and a different documentation, acceptable to the agency, can be prepared.

There may be costs involved in the acquisiton and continued use of Panvalet under the General Services Administration's plan, but they involve only those agencies that want help on the installation of the software or ongoing maintenance and support. Installation and training help costs $500. The annual maintenance fee is $850 for OS, $750 for DOS.

Pansophic's Federal Systems Office is at 1651 Old Meadow Road, McLean, Va. 22102.

Package Turns Back Threat of Reruns

By Chuck Pearce
Special to CW

HOUSTON — Foley's, a division of Federated Department Stores, is one of the oldest and largest department stores in Houston. Its DP shop does all the batch processing (more than 8,500 jobs per month) for eight area stores.

The shop processes general ledger, accounts receivable, payroll, and supply and inventory as well as on-line applications such as credit management, credit authorization and a "big ticket" furniture inventory system. It also has all stores on-line with point-of-sale activity.

With all of this activity, one thing Foley's doesn't want to worry about is reruns. Reruns, of course, mean a loss of time and a scheduling disadvantage. They also add unplanned resource requirements to the processor schedules, which could result in loss of on-line availability.

But reruns can be controlled; they don't have to control the DP shop. Attaining this control requires a two-phase approach:

- Determining the major causes of reruns and eliminating them.
- Processing the reruns that are inevitable in the most efficient manner.

Foley's has successfully attacked the front end of the rerun problem — the causes of reruns — with ongoing tracking of the causes and the institution of policies and procedures to control and reduce the number of reruns. The findings show reruns occur because of input errors, application program exceptions and computer operation errors, but the major source of reruns is hardware.

Hardware trends are analyzed on a daily and weekly basis, and regularly scheduled meetings are held with the hardware vendors. All areas of the DP staff are involved.

The operations, applications and systems groups from Foley's meet with the sales engineering and technical support groups from the hardware vendors. A

(Continued on Page 28)

'Maximus' Builds DG Programs

BUFFALO, N.Y. — Maximus from Collective Computer Marketing, Inc. has been described as a multidimensional source code program generator that produces structured programs in virtually any standard programming language. It has been used extensively to generate Cobol and PL/I, a spokesman said.

Developed by Maximus Systems, Inc., the software was originally intended for large-scale systems. Although it still functions in that environment, it is currently operative on Data General Corp. CS and Eclipse minicomputers as well, the spokesman claimed.

In its latest setting, Maximus is capable of generating interactive Cobol under Icos; commercial Eclipse Cobol under DG's Infos; and DG's Interactive Data Entry Application (Idea) FPL code, also under Infos. The generated code "fully utilizes Infos' file management structures," the spokesman said.

Maximus is even capble on generating source code for IBM-based applications on standard DG systems, he continued.

The software works from "fill-in-the-blanks" types of forms "that virtually eliminate missed parameters," and the entry work is done on-line through CRTs. Users are supported in this effort by option menus, the spokesman noted.

Maximus is said to rely on the philosophy that good programs should be copied and that programmers shouldn't waste time redoing what has already been done. The generator builds its source code from what amounts to an internal library of miniature program structures, based on the individual user's entries on the CRT.

Maximus costs "about $15,000" for use on DG's CS line of minicomputers, plus a charge of "less than $100/mo" for maintenance, starting from the date of initial acquisition, and $1,000 for each langauge beyond those included in the base packaging.

The generator software requires less than 12K bytes of memory on a CS unit, Collective said from 3527 Harlem Road, Buffalo, N.Y. 14225.

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Package Gives IBM Utilities

LYONS, Ill. — Special 1 is a general-purpose utility designed to provide most of the functions of various IBM standard utilities as well as many functions not available elsewhere, according to its vendor, General Electronics.

The software will copy, dump or print any data set that can be processed by Qsam, including both sequential and partitioned formats, a spokesman said. It accepts fixed, variable or undefined records in any record form or block size acceptable to IBM's OS, he added.

Special 1 also provides blocking, deblocking and conversion to or from undefined or variable formats, based on specifications contained in the DD card or data set label.

The program can produce as many as four sequential data sets or members under control of DD statements. Optional printed output can be created based on the presence of other specific DD statements.

The printed outputs include a character-formatted dump, a vertical hex dump and a vertical dump similar to the hex routine but in an octal representation, which the spokesman said is useful for printing files from a 6-bit machine.

Special 1 can work with files written in Ebcdic, Ascii, Burroughs Corp. or Honeywell, Inc. 400 or 2000 series codes. It costs $1,995 from General Electronics, P.O. Box 79, Lyons, Ill. 60534.

'UCC Fifteen' Eases Worry Of Reruns at Retail Chain

(Continued from Page 27)

fixed agenda for the meetings is set and includes a discussion of any problems that have occurred since the last meeting.

A portion of every meeting is devoted to planning. These sessions are supplemented with at least one full planning session during the year. Here, the next 12-, 18- and 24-month objectives are laid out. On the programming and data entry side of the rerun question, Foley's continually tries to identify the causes of problems, especially the repetitive causes, and to eliminate them through programming changes where applicable.

The problems on the operations side are addressed through education, improved scheduling and automated job control procedures. Production JCL and Procs are maintained in libraries with very limited access. The goal has been to build a pyramid of libraries that would have production control totally on-line and under tight security.

Automatic Restart

Under both DOS and OS, the back end of the rerun problem — how to handle the rerun — has been approached in the same way. In both environments, Foley's has installed an automatic restart system.

When running under DOS/VS, an in-house restart manager was written to eliminate the time-consuming and error-prone procedures which were necessary to handle reruns in that environment. Foley's had established job and procedure libraries using IBM's Power/VS and Epat from SDI, Inc.

Previously, the initiation of a rerun required punching cards for the pertinent library members in order to set up a rerun deck. After the deck was punched, someone would change some of the cards, add some and eliminate some to build the proper rerun stream.

The restart manager package was able to eliminate this card punching and jobstream building process and allowed the staff to keep all the Proc and JCL decks constant. With the restart manager, the inclusion of a single card was all that was necessary to instruct the system to the steps necessary for the rerun. Thus the rerun was accomplished without any card punching.

More Complex Challenge

When Foley's went to OS, the rerun challenge continued, but in a more complex environment. The front-end solutions to the causes continued to be applicable and sufficient. But the restart manager, which was the back-end solution under DOS, was not designed to handle problems unique to OS.

The reruns encountered under OS confirmed that there was a definite need for a restart manager. Writing one for OS would have taken too much time and money. That was when Foley's looked at vendor packages.

University Computing Co.'s UCC Fifteen was chosen, since it was just about the only package on the market that would fulfill Foley's requirements.

UCC Fifteen has helped by resolving the bias number adjustments for generation data groups and by resolving other problems on the OS catalog — namely, the uncataloging and scratching of files that are to be recreated during the restart or rerun.

In addition to giving job control support, UCC Fifteen interfaces with Foley's tape management system, UCC One. Under OS with UCC One, there are two catalogs for tape management, the standard OS catalog and the UCC One Tape Management Catalog (TMC).

The UCC Fifteen restart management system addresses both of these catalogs simultaneously. Tapes that are to be re-created during a rerun are uncataloged from the operating system catalog, and the tape expiration date in the UCC One TMC is changed to the current date so it may be scratched.

Pearce is group manager of opertions at Foley's DP center in Houston.

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Package Aids Plotting on PDP-11

APPLETON, Wis. — A plotting package written for Basic Plus use on Digital Equipment Corp. PDP-11s linked to Tektronix, Inc. 4010 series terminals, TSP-12 analog plotters or character-oriented terminals is now available from Lawrence University.

The package is made up of compact, versatile and coordinated sets of subroutines supporting fundamental plotting operations through mnemonic entry points which can be extended by attaching another subroutine if the user wants to draw character strings, a spokesman said.

The Lawrence facility is distinguished from other plotting routines for Basic Plus use by its device independence, its small size and its deferred plotting capability, he claimed.

Device independence means that once completed and tested using one plotting device, a user's driving program will produce the same display with a different device merely by appending the appropriate set of subroutines, the spokesman asserted.

The subroutine for each plotting device requires less than 4K words of memory. Memory overflow is rare even on an RSTS/E system that limits each user to 8K words, he said.

The package costs $400 for commercial users, $250 for nonprofit organizations and $150 for educational institutions, the spokesman said from the Computer Center Publications office, Lawrence University, Appleton, Wis. 54912.

'Filetab' Available for Larger ICL 2900s

MANCHESTER, England — Level 5 or 6 of Filetab, a parameter-driven report writer from the National Computing Centre; already implemented on IBM 360 and 370, Univac 1100 and ICL, Inc. 1900 and small 2900 systems, has now been installed on ICL 2960 and larger CPUs under VME/B as well, a spokeswoman said.

To ease conversion from 1900 Filetab to the 2900 version, a syntax checker is supplied which may be used to determine that programs have been converted correctly and will "compile" without error on the larger mainframes, the spokeswoman noted.

The package utilizes decision-table logic to create application programs far quicker than they could be written in Cobol, she said, adding that Filetab operates as a "load-and-go" system so users also avoid the time required for conventional compilation.

Capable of processing 17 I/O files — which may be any combination of sequential, indexed sequential, Cincom Systems, Inc.'s Total or user-defined structures — Filetab includes an internal sort. A report generation facility supports eight control levels and 32 totals within each level.

The ICL 2900 version, ready for distribution now, costs from 4,000 to 6,000 pounds sterling.

Agency arrangements are under negotiation for the U.S. market, and details of those negotiations may be available in the next few weeks, the spokeswoman concluded from the National Computing Centre, Oxford Road, Manchester MI 7ED, England.

C Ready for DEC Users

NEW YORK — A compiler for the programming language C has been introduced by Whitesmiths Ltd. for use on Digital Equipment Corp. PDP-11 minicomputers.

Versions of the compiler are available for DEC's RT-11, RSTS/E, RSX-11M and IAS settings and for Western Electric's Unix operating system. The package includes a run-time library of utilities and I/O routines, a spokesman said.

The compiler operates in three sequential passes and can replicate itself in 16K words of user space under Unix. It can do the same on DEC LSI-11 microcomputers with 20K words of user memory and one disk drive, he added.

All facilities of C are supported, including bit fields and defined types which are not implemented in the C compiler provided with the standard Unix system, the spokesman noted. The runtime library is more complete and systematic than that described in Kernighan and Richie's *The C Programming Language*, he claimed.

A perpetual binary license for use of the compiler on a single CPU costs $500 plus a charge for delivery media, the company said from 127 E. 59th St., New York, N.Y. 10022.

'Pashal' Backs Oil Companies

DALLAS — As a real-time petroleum accounting system from Hal Systems & Services, Inc., Pashal provides oil and gas companies with a spectrum of support on Datapoint Corp. hardware or on a remote service basis, a spokesman said.

The applications included in the software cover general accounting control, accounts payable, joint interest billing, income distribution and lease operations management and payroll, he noted. A separate but integrated system provides land-lease records management.

Pashal is written so it can support a small petroleum accounting operation on Datapoint 4540 or 4530 equipment. On the other hand, Hal uses the software in its service bureau business on a Datapoint Attached Resource Computer (ARC) configuration.

Modular in design, the system can be installed at a user's site for $20,000 to $50,000, depending on required capabilities, the spokesman said, from 11520 N. Central Expressway, Dallas, Texas 75243.

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DBMS, Programs Aid Factories

SANTA MONICA, Calif. — Users working with Data General Corp. or Digital Equipment Corp. minicomputers have been offered a "mainframe-like" data base management system (DBMS) and application software for a variety of functions, all from Disc/310 Corp.

The DBMS supports fully inverted file structures and allows users to create and modify files, screen formats, prompting menus and output reports without changing application programs, a spokesman claimed.

The application software, built to utilize the facilities of the DBMS, support material requirements planning (MRP) and other manufacturing applications, distribution and accounting functions and word processing or text editing, he added.

The distribution and accounting programs include open order entry, invoicing, credit analysis, commissions, multiple pricing schedules, accounts receivable and inventory management, the spokesman said. The software also includes sales analysis, accounts payable, payroll and personnel recordkeeping and purchase order control.

The manufacturing applications include, in addition to a time-phased MRP, work-in-progress and production control, a bill-of-materials processor, support for engineering change orders and part number cross-references.

The logic for quotations and bids, budgets for labor and materials, historical costing information, purchasing/receiving/inspection of materials and comprehensive job costing are also part of the manufacturing support, the spokesman said. This range of programs, like the general accounting packages, are all integrated into a general ledger system, he noted.

The DBMS is said to invert or index on any field in a file and to access indexed fields across multiple files. It also keeps screen formats and data definitions independent of application programs, the vendor said.

The DBMS costs $10,000; the distributors' accounting routines, $20,000; and the manufacturing applications; $30,000, with MRP and the word processing modules sold separately for $5,000 each.

The company is at 1840 Lincoln Blvd., Santa Monica, Calif. 90404.

Sharp Adds Telex Entry

TORONTO — I.P. Sharp Associates Ltd. has made its remote computing services accessible through the worldwide public Telex network in addition to continuing access by local telephone calls whenever the user is near a Sharp branch office.

Sharp currently provides telephone dial-up access in more than 225 cities worldwide, but the Telex connection expands that service range to countries and geographic areas in which Sharp itself is not yet established. It might also relieve a user's phone lines of data traffic if that has become a problem, a spokeswoman noted.

Although Sharp's services are APL-oriented, much of the user Interface with programs in the company's library do not require transmission of APL characters. In those cases, the Telex units will serve the user well. For those who wish to write programs in APL, however, the Telex facility "is not recommended," the spokeswoman stated.

There is no increase in connect time or system use charges through the Telex facility, but users are responsible for Telex charges, she said. Sharp currently provides two Telex access points — Rochester, N.Y., and Amsterdam, The Netherlands, she added.

I.P. Sharp is headquartered at 145 King St. W., Toronto, Ont. M5H 1J8, Canada.

'Ambase' an Interactive DBMS

LOUISVILLE, Ky. — A data base management system (DBMS) that enables users of Digital Equipment Corp. PDP-11 minicomputers to update files interactively, Ambase from Amcor Computer Corp. also allows changes in the file structure to take place without impacting application programs, according to a spokesman.

The data independence is provided, as with most DMBS, through the use of a data dictionary, he explained.

To speed report generation, Ambase allows 42 dynamic sorts to be maintained for any "logical system," the vendor's term for a data file under Ambase control. There can be 295 logical systems in an Ambase implementation, and each can contain 4.3G bytes of data in three different record formats.

Run under DEC's RSTS/E environment, Ambase can be accessed by a number of users concurrently, but a system-generated lock at the field level prevents multiple users from performing simultaneous updates on the same data, the spokesman noted.

The software supports 100 bytes of comment space per field, he added. This can be used to create prompting messages for easier data entry or other functions.

Ambase can be installed in a 16K-byte partition. It costs $12,500, Amcor said from 1900 Platside Drive, Louisville, Ky. 40299.

JES3 Course Set

TULSA, Okla. — A five-day intensive course on the "externals" of IBM's Job Entry System 3 (JES3) will be presented here Dec. 11-15 by Computer Systems Research, Inc. (CSR).

The $765 course is intended for technical supervisors, system planners, operations personnel, trainers and programmers, a CSR spokesman said from 195 W. Main, St., P.O. Box 45, Avon, Conn. 06001.

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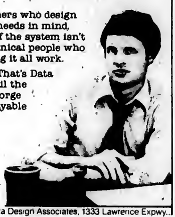

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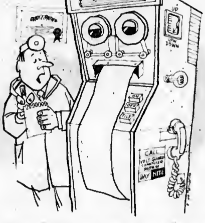

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A Good Prescription?

Actual Benefits Justified Early Move to DBMS

By Edward Seaman
And Martin Kral
Special to CW

PALO ALTO, Calif. — In 1969, the year when a data base management system (DBMS) was first introduced, Syntex, Inc., a pharmaceutical research and manufacturing company here, brought in $108 million in gross revenues. In the last financial year, gross revenues amounted to $380 million, a figure expected to triple by the mid-1980s.

The complexity of corporate structure has also increased significantly. Today the company is highly diversified, expanding in part by purchasing smaller companies. As these companies are acquired, they must be integrated with the corporate information system.

Hardware has expanded with the increased DP task, from an IBM 360/40 to the current IBM 370/158. However, the best measure of the changing requirements can be seen in the data base.

In the nine years of DBMS use, it has grown to contain hundreds of different record types and many separate data bases. Many of these data bases contain 25 or more interrelated record types.

Decision for DBMS

The decision to use a DBMS was made for several reasons. Applications were arising that were unsuited to the existing sequential files. Also, Food and Drug Administration (FDA) requirements were increasingly demanding. Programmers were faced with the specter of maintaining a bewildering myriad of pointers.

Since it was apparent that the data base would be continually evolving, a high degree of data independence (the ability to alter data structure without impacting applications) was required. Total, the DBMS from Cincom Systems, was selected as best suited to these needs.

In early 1972, a complicated quality control system and a standard order entry system were in place. Quality control in the medical drug industry requires extensive tracking and historical analysis of products. FDA requirements impose stringent procedures and corresponding structures.

Without a DBMS, these systems would have been difficult to develop. At that time, however, Syntex's data base had not yet been subjected to the rapid growth that was to soon follow.

Many Syntex applications had been on-line from the beginning of DBMS use. In mid-1972, the decision was made to move from a home-grown teleprocessing (TP) monitor to IBM's Customer Information Control System (CICS). At this time, TP support packages were not as common as today, and Syntex found that the DBMS could be used to develop general-purpose mapping and data entry utilities.

Complex Recovery

Recovery in an on-line environment was much more complex than in a batch environment, and warm restart programs were developed to replace the previous cold restart logic.

Thus, by early 1973, the data base/data communications environment had been securely established. Programmers had become familiar with the DBMS and TP monitor.

It was at this time that Syntex embarked on its data base "boom." There appear to be two features of the DBMS which facilitated this:

- Because of the high degree

(Continued on Page 32)

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'In?uiry/IMS' Backed

WOODLAND HILLS, Calif. — Annual Improvement Maintenance and Support (Aims) service is now available to all users of the In?uiry/IMS package, according to a spokeswoman for Informatics, Inc., which recently took over the package from its developer [CW, Sept. 25].

For a yearly fee, Aims provides system releases, error analysis and correction support and system modifications are released between full-dress system updates, she said.

Announcement of Aims availability for In?uiry/IMS means the company has people in place, in the field and at headquarters, to provide support.

Aims service for In?uiry/IMS — after the first year, when it is free — costs $4,000/year, she added from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

Drug Company Finds DBMS Use Good Cure for Growing Pains

(Continued from Page 31)

of data independence of the DBMS used, expanding a data base is usually an easy matter. In fact, no full-time data base administrator (DBA) position was created until a year ago.

It is sometimes claimed that since the DBA is an expert, his task can be arbitrarily complex. The complexity of the DBA task generally increases with complexity of data base structure.

Consequently, if an organization envisages building a data base with extensive structure, it is advisable to ensure that the DBA task will always be within reasonable constraints.

- The ease of use of the DBMS for programmers was another critical factor. Increasing a structural complexity of a data base should not produce a disproportionate increase in analytical thinking when programming.

Not for Programmers

For example, space management should be out of the programmer's hands, handled entirely by the DBMS. If this is otherwise, new relationships will create additional program write and debug time.

In short, the fact that the DBMS used is a high-level "black box" has greatly facilitated data base structural growth.

Given the ability to respond relatively promptly to user requests, demands for services also increased. Syntex has a large and active scientific research group that is in constant need of new and improved systems.

At the same time, Syntex has been assimilating companies with different information organizations. The last five years have consequently brought a continual expansion of the corporate data base, until today it contains some 355 record types within 28 separate data bases.

The DBMS on-line work load has also increased — from about 40,000 data base accesses per day in 1972 to between 250,000 and 500,000 per day at present.

In the future, Syntex envisages an ever-increasing integration and expansion of its data bases as the company continues to grow and diversify. Systems will be made more user-oriented, particularly in the research, manufacturing and corporate management areas, providing more direct data access.

At the same time, the DBMS will provide the flexibility necessary to successfully provide for continued corporate growth.

Seaman is supervisor of systems and Kral is a data base analyst at Syntex, Inc. in Palo Alto, Calif.

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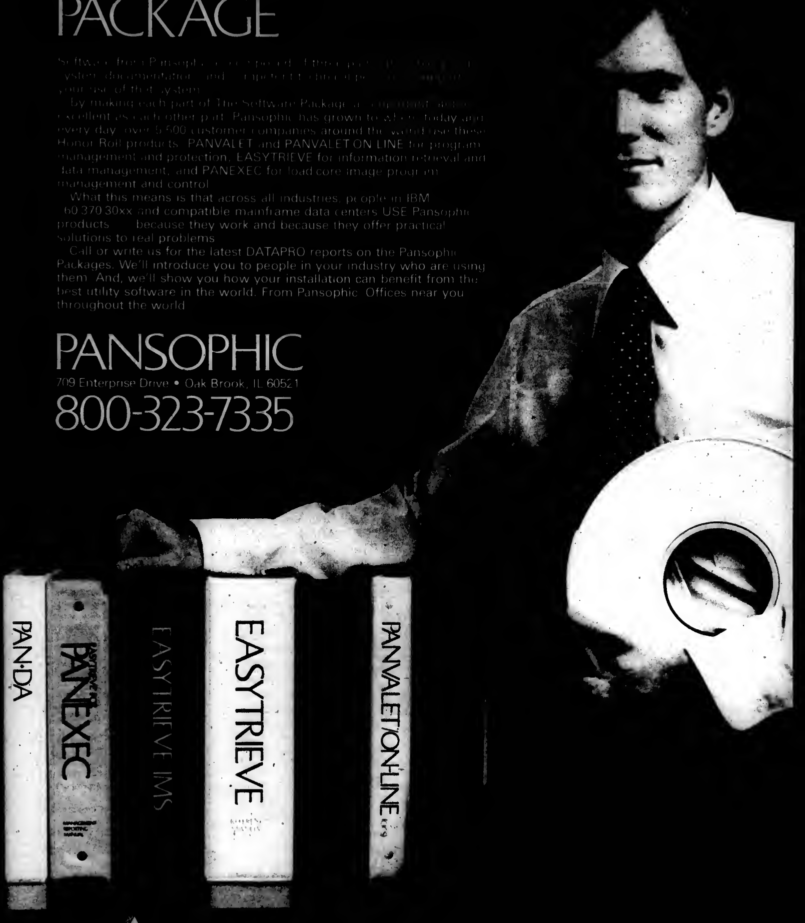


IBM Aids Personnel Work

WHITE PLAINS, N.Y. — A terminal-oriented system unveiled by IBM is said to be able to help users store, update and secure vital personnel information by using three interrelated and expandable data bases.

The software was designed for IBM 370s functioning under IMS/VS, CICS/OS/VS or CICS/DOS/

The Interactive Personnel System reportedly provides required personnel functions as well as facilities that allow nonprogrammers to define personnel-related applications. Data is stored in common data bases that can be customized to an organization's requirements, and an on-line inquiry and update feature allows rapid access to personnel files, according to a spokesman.

A procedure definition language permits the personnel department to specify system editing functions, to check that entered data conforms to predefined formats and to perform various other basic functions, the spokesman stated.

Data security features such as a user identification code, procedure execution and definition authority, data access codes and a password change procedure are also incorporated into the IBM package, he added.

The license fee is $1,100/mo for IMS/VS and CICS/OS/VS users and $800/mo for CICS/DOS/VS systems.

'Tel M' From Independent Eases 'Total' Operations

GREAT NECK, N.Y. — IBM-based users may work directly with data sets controlled by Cincom Systems, Inc.'s Total data base management system through CRTs running with CICS/VS and the Tel M interactive utility package from Labyrinth Systems, a spokesman said.

Tel M enables the user to add records to existing Total data sets, delete invalid or obsolete records, change "anything from a single byte to a complete record" within a data set, reestablish linkage chains to data sets or validate the structural integrity of any data set, he recounted.

In addition, the Tel M user may also delete linkage to bad records, find and selectively display records and handle a range of other file maintenance functions, all through simple commands on a CRT, the spokesman continued.

Records are displayed on the screen in character and vertical hexadecimal format. Bytes may be changed by moving the cursor directly to a specific byte, and the change may be made in either character or hex form, he said.

An alternative, special function screen is used to initiate data base searches, to mark fields in order to locate them on the record screen and to obtain file data. A third screen lists all the elements that are defined in the data base generation; it lists the length of each and its starting byte, relative to the beginning of the record.

While extensive searches are supported — indeed encouraged — by Tel M, the software also includes logic to prevent "runaway searches" that would affect response time for other transactions, the spokesman noted.

Some of the Tel M functions may be controlled by program function keys on the IBM 3270 but if the user's unit does not have that feature, Labyrinth's software will simulate the function.

Tel M installs under OS/VS and costs $5,500, the vendor said from 17 Barstow Road, Great Neck, N.Y. 11022.

Package Backs Banks With NOW Accounts

OAK BROOK, Ill. — The Demand Deposit/Credit Reserve system from Weiland Computer Group has been enhanced to process interest on demand balances in Negotiable Order of Withdrawal (NOW) accounts.

The updated system, designed to run on IBM 360/370 equipment under DOS, is said to feature comprehensive accounting options such as four user-defined interest rates, variable interest accrual methods and a service charge waiver capability.

The basic package integrates demand deposit account processing with extensive commercial account analysis, credit reserve management and account reconciliation, the spokesman noted. It handles savings-to-checking transfers; descriptive, combined statements — in check number or date sequence; and overdraft interest charging, he added.

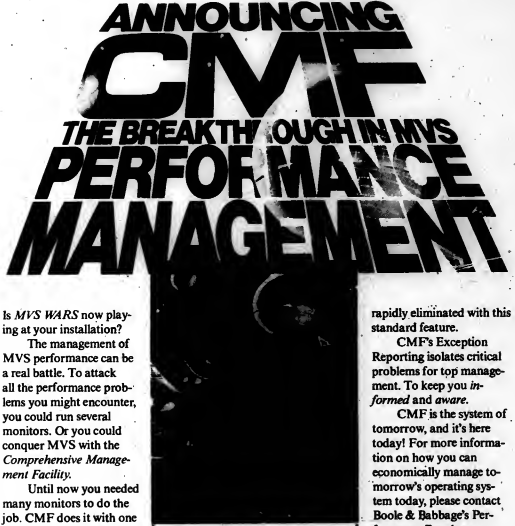
The NOW support includes a number of operational, government and customer reports. Bank and branch reports are generated daily, along with a journal reporting on the current status of the interest on demand service, the spokesman said.

The system also produces Internal Revenue Service interest reports and "complete customer reports" showing interest calculations and interest earned yearly, he continued.

Originally a batch system, the Weiland package is also available on-line under IBM's CICS.

Currently, the software costs $45,000 (DOS) or $59,000 (OS) for the batch version, plus $15,000 (DOS) or $22,500 (OS) if the on-line implementation is wanted.

Optional account reconciliation support costs an additional $9,000 (DOS) or $10,000 (OS), Weiland said from 1515 W. 22nd St., Oak Brook, Ill. 60521.



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No Time for Switching

Datapac Sees Limit to Voice, Data Mix

By **Ronald A. Frank**
CW Staff

CW Photo by R. Frank

Ken Russell, computer communications tester at the Datapac National Data Control Center, monitors the network's status. The board on the wall lists the diagnostic software installed at various control points in the network.

OTTAWA — Packet-switched network technology is best for transaction-type traffic, but there may be limitations to mixing voice and data on this type of system, according to Andrew M. McMahon, vice-president of the Computer Communications Group at Bell Canada.

The switching associated with a packet network is cost-effective for data because this type of transmission has gaps during which the switching can be performed. Voice traffic does not, McMahon explained during a recent interview.

Datapac is the packet network offered in Canada and it is one of the pioneering nets of this type. Datapac was planned before the CCITT X.25 packet network protocol was finalized, but the Standard Network Access Protocol (Snap) that was implemented later proved to be very close to the international standard.

About 900 terminals are now operating on Datapac, according to McMahon, and the number is growing. The devices supported by the network provide a broad range of compatibility for Canadian users.

Three Types of Service

Datapac currently offers three types of service, McMahon noted. The 3101 service supports asynchronous teletypewriter devices using a Network Interface Machine (NIM). Low-speed asynchronous terminals are supported through an Interactive Terminal Interface (ITI).

The 3201 service on Datapac supports buffered, pollable asynchronous terminals using the International Standards Organization's poll/select asynchronous transmission line protocol. Included in this category are the NCR Corp. 280 and 125 point-of-sale terminals and TRW, Inc. 4234, 4235 and 4236 Ascii credit verification units. The 3201 service typically operates on 1,200 bit/sec multidrop lines.

The 3203 service supports buffered, pollable, asynchronous terminals using an enhanced version of the IBM 2740 Model II transmission line protocol. These terminals are linked to the Datapac network using NIMs.

The first terminal supported by Bell Canada and other carriers was the Data Measurement Corp. Model 8901 buffered teletypewriter. Access to the 3203 service is via 1,200 bit/sec multipoint, multidrop facilities.

Support for 3270 Planned

Support on the packet network for IBM 3270-type synchronous terminals is slated for the first quarter of 1979, McMahon said. This service will allow binary synchronous terminals, such as the Vcom 2 offered by Canadian phone companies, to operate on the Datapac network.

Designated the 3303 service, the 3270 support will poll these terminals using Binary Synchronous Communications (BSC) line protocol. Host CPUs at the customer site will operate with the Datapac Modified Emulation Program (DMEP) software developed by Cambridge Telecommunications Corp. (CTX).

In the third quarter of 1979, Datapac service will be further expanded with support for multileaved Hasp workstations of the IBM 360/20 type. This service will probably be designated 3304 and will also support units made by Data 100 Corp., Datapoint Corp. and other vendors.

Even though the network supports such a diversity of terminal devices, McMahon said it is not the intent of the Trans-Canada Telephone System to offer DP-type services. "We will enhance the user's ability to move data without changing the contents of the message," he explained.

In addition to its domestic offerings, Datapac has direct connections to the U.S. Telenet and Tymnet packet networks. This means Canadian and U.S. users can access terminals and CPUs on either side of the border.

By 1981, McMahon said, a digital circuit-switching capability will be introduced for high-volume data traffic between multiple locations at high speeds. With this type of digital circuit switch available, it is possible integrated voice and data service could be offered on Datapac.

At this time, however, the inclusion of voice capability on the Datapac network is not a high-priority item, McMahon said.

Monitoring Center

One of the key elements of Datapac operations is the National Data Control Center at Bell Canada here in Ottawa. The center is the focal point for 60 control centers located at various points in the net that continually monitor operations.

Network status is displayed on three CRTs that list the quantity of packets transmitted on a link, the numbers of alarms registered by the Digital Equipment Corp. PDP-11 minicomputers and network analysis data.

Datapac monitoring points were scanned twice each second and, in many cases, faults are detected which are not enough to interrupt service. In one case a 1.54M bit/sec data link between Montreal and Toronto registered 173 line hits of less than .5 sec each.

The line hits were not enough to interrupt service to users of the link, but their discovery gave notice and to the national control center that it might be necessary to switch to backup facilities before the trouble escalated and affected data streams.

The network philosophy is to spot malfunctions before they become serious, McMahon explained. Although data traffic is still a small portion of the communications handled by Bell Canada, it is growing at the rate of 25% per year. As the data needs of users grow, new services will be offered on Datapac to meet the demand, he added.

Efficiency, Cost Savings Sell Store on Use of POS Network

Special to CW

ROCHESTER, N.Y. — A network of point-of-sale (POS) terminals has allowed a department store here to cut costs and improve efficiency in a number of DP applications.

Sibley, Lindsay & Curr installed a network of 589 Datatrol, Inc. RS-6000 POS terminals about two years ago, linking 60 company departments at nine locations to three Digital Equipment Corp. PDP-8 minicomputers.

The most tangible benefit of this network has been a reduction in data collection overhead, such as payroll costs, according to Fred Zinsser, Sibley's DP director. For example, the "back-office staff' has dwindled from 27 people to 14 in the audit area; merchandise control personnel are down from 15 to three; and the data entry staff has been pruned from more than 20 to 11 people.

One of the three 32K-byte PDP-8s is used to record sales, while the other two processors make up a credit authorization system. This system compares an application for a credit transaction with the subject's current "credit value."

A statement prompting authorization by a store manager is flashed on an Infoton Corp. CRT in the event not enough credit is available to permit the transaction.

The network has reduced the store's billing cycle time from "five or six days" to "two or three days," Zinsser stated. Moreover, the volume of delinquent accounts has dropped. Early billing seems to have a psychological effect that increases the likelihood of prompt payment, he observed.

Most Terminals Not Printers

In order to minimize operating expenses, about 70% of the terminals do not have a printer. All information is first written onto a sales check and then entered on the terminal. This has reportedly not resulted in long lines at the sales counters.

The selective use of terminals with printers

(Continued on Page 36)

Store Sold on Benefits of POS

(Continued from Page 35)

is one reason why Sibley's incurs a cost per terminal about half that of most POS systems currently available, Zinsser said. The company does, however, use Centronics Data Computer Corp. Model 101 printers to provide hard copies of credit references.

Sibley's has not found it necessary to have a redundant system at the store level to capture data in the event that communications is lost with the host processors. Redundancy is not needed because uptime for the POS network has been 99.3%, Zinsser said.

For the first 120,511 hours of operation, the network has been down only 1,115, according to Zinsser, who attributed 60% of this downtime to telephone line problems. When downtime has occurred, however, back-office data entry has gone smoothly, he added.

Mean time between failures (MTBF) for the nonprinting Datatrol terminals has been 26.2 months; the printing versions have experienced an MTBF of 11.4 months.

Variety of Reports

Since the inception of the POS system, Sibley's has been able to generate a wide variety of merchandising and financial reports in very short order. "Reports were never as quick, as thorough or as good as they are right now," Zinsser declared.

The system assists store buyers by indicating the flow of sales items. Other applications include a daily productivity report, a weekly report that compares sales personnel on the basis of performance, "instant" checks of cash-on-hand for spot audits and vendor analyses of how many goods have been sold in each style.

Training time for network personnel is said to be low. "This is because every phase of a transaction is prompted in a language the salesperson can understand. He does not have to learn any codes," Zinsser explained.

Sibley's gives each new sales clerk two 45-minute periods of training on the Datatrol POS terminal, although Zinsser said an "alert" trainee can learn the system in about a half-hour.

Training time alone accounts for a considerable savings, since training on a more conventional system might require two or three days, he said.

The customer is more at ease with the automatic credit authorization system because he is rarely aware that his credit is being checked, Zinsser added.

The accuracy of the POS network is rated at between 95% and 96% and correctable to 98% by incorporating a check digit. Prior to the net's installation, tag data collection yielded an accuracy that varied from store-to-store in the 60% to 80% range.

Data transmission through the network occurs at 1,200 bit/sec. Besides the terminals and minis, other hardware components include a number of California Computer Products, Inc. Model 215 disk drives as well as 45 in./sec Pertec Corp. Model 6640 tape drives.

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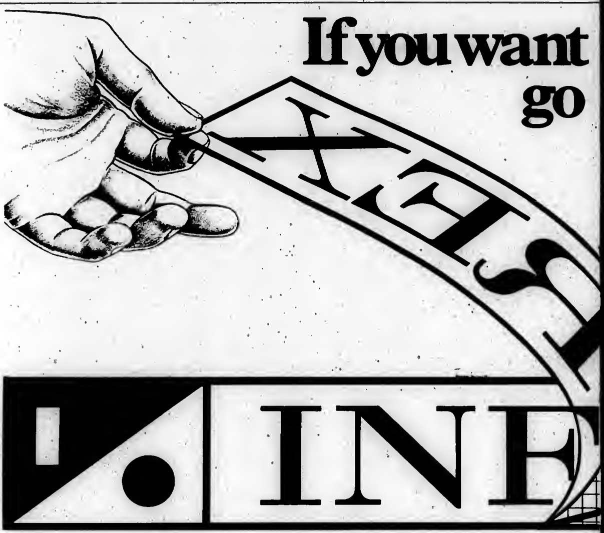
Packet Nets Discussed

PISCATAWAY, N.J. — The November 1978 special issue of the Institute of Electrical and Electronics Engineers' *IEEE Proceedings* is devoted to the subject of packet networks and directed to both the novice and expert.

The issue includes an introduction to packet networks as well as a discussion of protocols, theoretical developments, advanced network concepts and network issues.

"This special issue should be interesting reading for computer and communication scientists, engineers and others generally concerned with information processing," the institute observed.

Individual copies cost $5 for institute members and $10 for nonmembers. Prepaid orders should be sent to IEEE Service Center, 445 Hoes Lane, Piscataway, N.J. 08854.



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Board Adds Features to Decwriter LA35, LA36

SANTA CLARA, Calif. — A graphics modification for Digital Equipment Corp. Decwriter printers, available from Selanar Corp., will add such capabilities to the printer as vector-generated graphics, expanded character styles and higher speed, according to a Selanar spokesman.

The Graphics II system replaces existing electronics in DEC LA35 and LA36 terminals, the spokesman said. Bar code can be printed, and plans include a bar code reader option that will allow data to be transmitted like a keyboard entry.

Available as an upgrade to existing printers or factory-installed on a new printer, Graphics II consists of a microprocessor-controlled replacement circuit board for the Decwriter II. It comes with internal cables for easy installation, the vendor said.

The Decwriter is a matrix printer; the Graphics II allows printing of a dot anywhere on the page, with a total of 1,045,440 addressable points available per page, Selanar noted.

Graphics II has bidirectional line feed with quarter-line resolution, and the vector graphics capability allows a line to be printed between any two points on the page by specifying the end point coordinates using Ascii characters. This means graphics can be generated using the printer keyboard, Selanar explained.

Two Standard Fonts

Ascii and APL character sets are standard, while other character sets may be substituted. Characters can be rotated and printed in four directions and printed normal size, bold face or with expanded width.

The average Decwriter printer speed has been increased to 50 char./sec with Graphics II, and data may be transmitted in bursts of up to 1,000 characters at 1,200 bit/-sec, the vendor stated.

Other standard features of Graphics II include EIA RS-232, 20mA current loop and TTL interfaces; automatic line feed; and horizontal and vertical tabs.

As a field-installable circuit card, Graphics II costs $850 from Selanar at 3054 Lawrence Expressway, Santa Clara, Calif. 95051.

Qantel Emulators Offer IBM 2780, 3780 Protocols

HAYWARD, Calif. — Software emulation of IBM 2780 and 3780 protocol is available from Qantel Corp.

The 2780 emulator was designed for the "moderate" communications user and for IBM 360 or 370 applications, Qantel said. This package handles data speeds to 19.2k bit/sec.

The 3780 emulator is said to make more efficient use of communications lines and provide the full capability of the IBM 3780, including compression and conversational replies through an operator's console.

The software is available without charge but requires a Qantel synchronous communications controller, which costs $2,500, the vendor said from 3525 Breakwater Ave., Hayward, Calif. 94545.

Novation Units Meet FCC Rules

TARZANA, Calif. — Novation, Inc. has announced a line of modems, the 4000 series, in 300- and 1,200 bit/sec speeds.

Available in both stand-alone and rack units, the modems are said to meet all standards set by the Federal Communications Commission (FCC), the Electronic Industries Association (EIA) and the Consultative Committee on International Telephone and Telegraph.

The 300 bit/sec units are available with acoustic coupling and FCC-registered direct coupling, while the 1,200 bit/sec units are available for leased lines and FCC-registered direct coupling to dial-up circuits.

Novation offers an expandable rack arrangement in which up to 16 active modem cards can be accommodated.

The 300 bit/sec models range in cost from $275 to $400 and the 1,200 bit/sec units are priced from $375 to $600 from Novation, Department P1, 18664 Oxnard St., Tarzana, Calif. 91356.

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Disk, Memory Also Boosted

Data 100 Model 85 Gets Remote Workstation

MINNEAPOLIS — Data 100 Corp. has enhanced its Model 85-based series of remote information systems by adding remote workstations and increasing both memory and disk storage capacities.

With the addition of up to eight remote operator workstations on the Model 85, users can access resident fields via a multidrop secondary communications line using a synchronous interactive protocol at 4,800 bit/sec from virtually anywhere in their network, the vendor stated.

The workstations may be stand-alone operator stations, printers or a cluster of both, a spokesman noted.

The primary line allows the Model 85, via an attached communications processor, to communicate in synchronous protocols using point-to-point or multipoint techniques and in Synchronous Data Link Control (SDLC) communicatins. Other emulators include Hasp, IBM 3270 and 3780, Univac 1004 and NTR, Control Data Corp. 200 UT, ICL, Inc. 7020; and Burroughs Corp. line protocols.

Memory Expansion

The expanded memory option increases the maximum capacity of the Model 85 from 128K to 256K bytes (available in 64K-byte increments) and raises the minimum system size from 96K to 128K bytes, Data 100 said.

This expansion improves the company's RPG-II and transactional Cobol (Ansi 1974, Level 2) processing capabilities by developing fill-in-the-blanks data entry and remote file management activities for such applications as order entry, inventory control, payroll, production control, asset management and general ledger, according to the vendor.

The memory option also offers double-bit error detection with single-bit error correction capabilities, ensuring that any memory parity errors are automatically corrected without interruption of program execution or function, the company claimed.

Disk storage capacity has also been increased from a maximum of 100 million char. to 245.6M bytes of fixed-disk storage, allowing users a selection of cartridge and fixed-disk capacities starting at 10M bytes, Data 100 continued.

The enhancements are "part of an ongoing strategy to help our customers further distribute their data base-oriented functions to remote sites, as well as unburden the central computer and allow it to handle other processing activitites without increasing its capacity," the vendor said.

The Model 85, introduced in April 1978, operates in conjunction with the company's current models 76, 78 and its Keybatch systems to provide batch communications, data entry, IBM 3270-compatible on-line inquiry, stand-alone processing and file management activities at sites remote from the host computer, the spokesman noted.

The Model 85 consists of a control unit with 128K to 256K bytes of main memory, 10M to 245.6M bytes of fixed and removable cartridge disk storage and up to 16 CRT workstations with 1,920-char. screens and data entry keyboards.

Peripheral equipment includes the use of up to five printers ranging in speed from 62- to 1,250 line/min and 9-track, 800-and 1,600 bit/in. magnetic tape drives.

Configurations, Prices

A typically configured Model 85 system with six operator keystations, 128K bytes of memory, 30.5M bytes of disk, 300- and 62 line/min printers connected to a Model 76 communications processor with 150 card/min reader, leases for $2,787/mo on a one-year lease, including maintenance, and sells for $93,419. Other Model 85 systems begin at $1,660/mo on a one-year lease.

The expanded memory options, available in 64K-byte increments up to 256K-bytes, lease for $120/mo on a one-year lease; the purchase price is $4,032. The expanded memory feature will be available in the third quarter of 1979.

The expanded disk option is available in 20.5M-, 41M- and 61.4M-byte increments and leases (and sells) for $275 ($9,240), $425 ($14,280) and $550 ($18,480), respectively. The lease prices include maintenance.

The expanded disk option will be available in the first quarter of 1979.

The remote workstation support feature, which includes a communications controller interface and appropriate software, leases for $139/mo on a one-year lease, including maintenance; its purchase price is $4,662. It will be available in the third quarter of 1979.

A remote workstation configuration can be leased for $343/mo on a one-year lease, including maintenance.

Data 100 is at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

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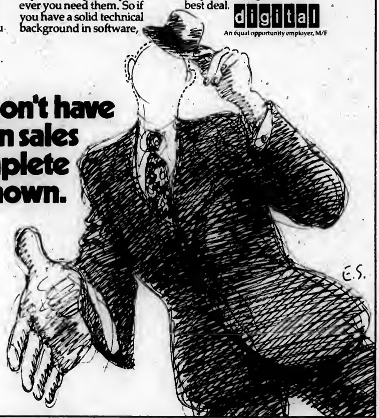

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System Monitors, Manages Phone Use and Cost Data

WALTHAM, Mass. — A standalone, computerized system for monitoring and managing telephone utilization and cost data has been introduced by Telephone Management Systems, Inc. (TMS).

The real-time Zap-Call system stores and processes data on telephone calls and reports this information on demand, TMS declared.

As a result, nonbusiness calling can be effectively minimized, TMS said, and budgeting, network analysis and client chargeback procedures can be expedited.

The system identifies calls by extension, duration, location and cost; allocates telephone costs by department, division or client number; and provides reports on both a detailed and summary basis, TMS explained. The system is reportedly compatible with existing computerized PBX equipment.

Zap-Call is available in three models that can handle from 50 to 600 phone lines and store 10,000 to 25,000 calls. Network management reports are also available for efficient use of Wats, Transmission and Information Exchange and Fixed Area lines.

The system costs $10,350 or more, depending on customer requirements, TMS said from 460 Totten Pond Road, Waltham, Mass. 02154.

Spectron Reduces Price Of Datascope by $1,900

MOORESTOWN, N.J. — Spectron Corp. has reduced the purchase price of the D-301 Datascope monitor from $6,800 to $4,900.

In announcing the price reduction, Spectron said the large number of orders for the D-301 since its introduction earlier this year "has enabled the company to increase its production plans and thus reduce the price of this Datascope monitor."

Line Monitor

The D-301 is a portable, general-purpose data communications line monitor that provides a full-duplex display of transmit and receive data. It features independent line discipline set-up for the transmit and receive sides of the line.

Full-duplex data at transmission speeds up to 72K bit/sec can be stored in a 262K-bit electronic buffer. A search of the buffer contents using a user-selected argument of up to four characters is standard.

Displayed data can be frozen, and the code, bit order, right or left justification (for less than 8-bit characters) and location of highlight markers can be changed.

Spectron is at 344 New Albany Road, Moorestown, N.J. 08057.

Dataroyal Adds Faster Version To 7300 Line

NASHUA, N.H. — Dataroyal, Inc. has added a higher speed version to its IPS-7300 line of intelligent hard-copy terminals.

Like other members of the IPS-7000 family of intelligent printing systems, the 150 char./sec IPS-7326 combines a matrix printer with an 8-bit programmable microcomputer. A movable data input station consisting of a gas discharge display and Ascii keyboard is also standard on the system.

The terminal was designd for data logging, factory data collection, label printing and other materials and information handling jobs requiring both intelligence and output printing capabilities, a spokesman said.

Meets Changing Needs

The unit's microcomputer architecture allows the Model 7326 to be programmed and reprogrammed to meet changing applications requirements, the spokesman said.

Programming is done by plugging in programmable read-only memory chips.

An IBM 2848-compatible serial interface is standard on the IPS-7326 and a 20mA current loop interface, as well as other serial interface types, are available as options.

Price for the IPS-7326 is $4,675 in single quantities and $3,675 for OEMs.

Delivery is 30 days from Dataroyal, Inc., Main Dunstable Road, Nashua, N.H. 03060.

Switch Selects CRT Terminals

ALEXANDRIA, Va. — Atlantic Research Corp. has introduced a desktop video switch primarily intended for selection of IBM 3270 and related CRT terminals in a DP center.

The VSM-1-4 switch is available for single-channel, desktop switching only.

No Power Required

No power is required to operate the unit and all connections are made at the rear panel by five male coaxial connectors, the vendor said.

The VSM-1-4 costs $145, Atlantic Research said from 5390 Cherokee Ave., Alexandria, Va. 22314.

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IBM Users Backed

PIX-II Links Get Support for Floppy Diskettes

LARGO, Fla. — Paradyne Corp. has unveiled support for remote flexible diskette I/O units on its PIX-II virtual data links, which provide a virtual data path from the byte multiplexer channels of IBM 360, 370 or 30 series CPUs to one or more remote locations.

The Paradyne Model 7810 disk drive and Model 7211 controller are said to reduce communications line and modem costs for users of key-to-diskette data entry equipment in distributed processing networks.

Under the IBM Synchronous Data Link Control protocol, the PIX-II diskette support allows data transmission from multiple remote peripheral devices through a single communications line to an IBM mainframe without the need for teleprocessing software or a front-end communications controller at the host, a Paradyne spokesman explained.

PIX-II systems include a Local Control Unit (LCU), which attaches to the host CPU's byte multiplexer channel, and Remote Control Units (RCU) at dispersed sites. The RCUs can support multiple IBM and/or Paradyne devices, including the flexible diskette I/O units as well as CRT terminals, printers, card readers and tape drives.

All data communications functions are transparent to both the host and remote users, the spokesman said, and remote devices function "virtually" in local mode.

The Model 7810 disk drive costs $3,200; it can be leased for $165/mo on a five-year plan that includes maintenance. The Model 7211 controller costs $1,300 or $35/mo on the five-year plan including maintenance.

Paradyne is at 8550 Ulmerton Road, Largo, Fla. 33541.

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Devices Measure Bit Error Rates At 150M Bit/Sec

N. BILLERICA, Mass. — The bit error rate of digital communications, fiber-optic and magnetic storage systems can reportedly be measured up to 150M bit/sec using two devices announced by Tau-Tron, Inc.

The Tau-Tron Model MN-301A Bert Transmitter and Model MB-301A Bert Receiver operate at rates from 1M- to 150M bit/sec and use pseudo-random data patterns to exercise the system under test and determine the bit error rate, the vendor said.

Two pseudorandom sequence lengths are employed: 127 bits and 32,767 bits.

Aside from the two pseudorandom sequences, the MN-301A can generate an alternating "1100. . ." test pattern. Errors can be injected into the pseudorandom data at an internal rate of two errors per 100 bits of data or at an externally determined rate, the vendor continued.

The MB-301A provides bit-by-bit error detection using an internally generated reference pattern. True or complement output data may be selected, and synchronization may be manual or automatic.

Bit error rate or cumulative errors can be displayed by the four-digit LED display, Tau-Tron noted.

Autoranging exponent selection is provided for bit error measurements. Variable display hold time and binary code decimal printer output are standard features.

The counter and display can also be used as an independent frequency counter.

The MN-301A costs $3,000 and the MB-301A costs $5,000, Tau-Tron said from 11 Esquire Road, N. Billerica, Mass. 01862.

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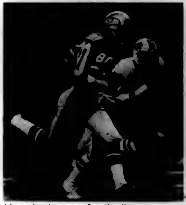
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Memory Doubled to 8M Bytes

User 'Ecstatic' With Add-On for 3033

By Howard A. Karten
CW Staff

CHICAGO — Zurich American Insurance recently installed an Intel Corp. add-on memory on its IBM 3033, becoming the first user of such a unit on that system. The 4M-byte unit supplements the 3033's original 4M bytes of memory, and the addition has made the system's users "ecstatic," according to Tom Regan, Zurich's computer center manager.

"The effect of the additional memory became most apparent in our field operations. Before its installation, response time [on Zurich's teleprocessing network] averaged between 30 seconds and two minutes. Now we're down to three- to five-second response time out in the field. Both field operations and our programming staff are ecstatic," Regan said.

The additional memory has been working perfectly, Regan reported, adding he is pleased with the cost savings as well. "The unit cost us $230,000, compared with the IBM price of $225,000 for only 2M bytes of memory," he noted.

Zurich uses its system virtually around the clock, seven days a week, but was able to clear the weekend of Nov. 11-12 for Intel to install the memory.

Three Reasons

The company chose Intel as the supplier for three reasons — the unit's price, the delivery schedule and the company's past experience with Intel, Regan stated.

Zurich, a subsidiary of a Swiss-owned company, had been using an IBM 370/158 with Intel memory before moving up to an IBM 3033. That experience with the independent memory maker impressed Zurich.

"The Model 158 had 3 M-bytes of memory that was extremely reliable for us. One of the key areas we liked was that Intel had its own service force, rather than using the general maintenance people, and it seemed to be the first to be able to deliver 3033-type memory," Regan said.

Although insurance companies often have a reputation for being extremely conservative and sticking with IBM, the DP manager noted this was not the case with Zurich. For example, "we do not have any IBM terminals in our network," Regan noted.

'Weird' Problem

Regan observed that the installation of the add-on memory went "fairly smoothly, from Intel's point of view. It did have one problem. It had a hell of a time debugging, but it

(Continued on Page 52)

Switch from 370/148 to AS/5 Powers DP Company's Services

By Jay Woodruff
CW Staff

DURHAM, N.C. — Three months after replacing an IBM 370/148 with an Itel Corp. AS/5-3 processor, Triangle Information Systems, Inc. here is "very happy" with the results.

Itel's hardware costs no more to lease than the IBM gear and, except for minor start-up problems, the AS/5 has offered excellent reliability in the short time it has been operating, according to Raymond J. Stanley, Triangle's president.

Triangle, which provides DP service to companies that prefer not to install in-house systems, decided to upgrade because its commitments to customers were about to strain its ability to provide services. The company wanted to "gain on capability so that we would not run short as more service was needed," Stanley said.

The AS/5, installed in August, has 1M byte of memory, as did the IBM 370/148 it replaced. However, it uses only 55% of the electricity and air conditioning of the IBM 370/148.

Triangle plans to upgrade the processor to 2M bytes and to add a second 2M-byte AS/5 in January. The 4M-byte system will be able to operate on the air conditioning previously needed to run the 1M-byte 370/148, Stanley said.

More Power

According to Stanley, "a 45-minute job now takes 15 minutes" with the AS/5, which has three to four times the computing power of the Model 148. "We needed more compute power for adequate user response," Stanley said, "and we decided that for the lease cost of the Model 148, the AS/5 provides the performance of the Model 158 and offers field upgradability."

The AS/5 is expected to cost less over the period of a seven-year lease than the 148 because it can be upgraded; the 148 would have had to be replaced upon reaching its performance limits. The cost of physical replacement was the single big factor that influenced Triangle to lease the Itel gear, Stanley said.

Triangle provides services that find taking advantage of its large system less expensive than buying their own. Those companies range from small businesses that need standard business programs to wholesale distributors with more sophisticated program needs.

Stanley said upgrading to a larger and more powerful system allows Triangle as well as the companies it serves to take advantage of the decreasing cost of hardware

(Continued on Page 46)

STC Doubles Track Density On IBM 3350-Type Disk Drive

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has announced what it claimed is a major breakthrough in disk technology: the doubling of track density on a 3350-type disk drive. The drive will be available in May 1979 at prices STC said are 20% to 30% lower than those charged by IBM for a comparable amount of disk storage.

Installed models of STC's 3350-compatible drive, the Model 8350, are field-upgradable to the increased capacity for a price of $19,400, a spokesman noted. The A2, B2 and C2 models of that drive are all included in this upgrade capability.

Gary Holtwick, manager of systems and product support for STC, stressed that no software modifications will be required by users who want to take advantage of the doubled capacity because the drive appears to be two 3350-type drives to an IBM 370 mainframe.

The drive, labelled the 8650 by the company, is identical to the 8350 in other specifications; it offers 8.5 msec latency, 25 msec average track-to-track seek time and a transfer rate of 1,190 byte/sec, Holtwick said.

The six drives in the 8650 family — the A2, B2 and C2 and the fixed-head versions of those drives (A2F, B2F, C2F) record data at a track density of 957 track/in., according to Holtwick, who said this compares with 485 track/in. for IBM's 3350. A double-capacity 3350-type drive introduced earlier by Control Data Corp., the Model 33502 [CW, Sept. 18], also achieves double density, but that is done with a track density of 660 track/in. and an increased number of platters, according to a CDC spokesman.

The STC breakthrough was achieved

(Continued on Page 48)

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Service Bureau Moves From 370/148 to AS/5

(Continued from Page 45)

so they can all control the cost of increasingly expensive personnel.

IBM Tape, Itel Disk

Triangle uses four IBM tape drives and control units, but uses Itel disk drives because Itel offers a reduced price if the company buys a complete Itel system. Stanley did not have figures available to show the savings involved in buying a complete system, but he did say it was in the neighborhood of 15%.

Thirty-four terminals, including a mixture of CRTs and printers, are used by Triangle and its customers. An IBM System 7, front-ended to the Itel system, receives customer orders which have been called into remote terminals. It runs unattended 24 hours a day and can restart automatically after a power failure.

With the Itel gear, Triangle has maintained "expense parity" with the previous system and has achieved 95% system redundancy, Stanley said. The Itel gear also is more consistent in its user response time.

"We formerly had a response of about 1 sec if the system was not being used heavily, and response was not consistent. Now user response is very consistent at 1 sec," he said.

Stanley plans to replace the DOS/VS operating system with OS, but Triangle has not made a decision on which version it wants to use. "We're looking for far greater capability to match our projected growth," he explained.

Triangle uses IBM and Pansophic Systems, Inc. software packages for itself and its customers. Stanley characterized the packages as "run-of-the-mill computing applications" such as order entry, inventory control and accounting.

"Service in installation and maintenance has been exceptional," Stanley said of the Itel machine. Itel policy is to maintain a field service facility near its installations, and one was already located in nearby Raleigh.

Engineers on Call

Two field engineers are on call, and they arrive on site within the hour, according to Stanley, who was told that 95% of the parts for the AS/5 are stocked in Raleigh and that any other parts which might be needed can be brought in overnight from Itel's Atlanta distribution center.

The engineers call in to check on the machine "almost every day," Stanley said, "before any minor problem gets serious."

In the eight weeks after the system was installed, it went down three or four times, but for no more than an hour each time, he noted. No other problems have surfaced.

Stanley said it is reassuring that Itel has been able to provide rapid service response and parts availability: "I have not compared maintenance figures yet, but everything has been going so well that I haven't been worrying about it too much."

Word Processing Symposium Set

WILLOW GROVE, Pa. — The International Word Processing Association (IWP) will hold its annual Spring Symposium on Feb. 13-15 in Los Angeles.

The symposium is divided into two parts, a conference program and vendor exhibit. The conference will include panels, sessions and workshops on administrative support, photocomposition, word processing management, electronic mail, work measurement and chargeback systems and word and data processing integration.

Registration costs $125 for IWP members and $150 for nonmembers. Further information is available from IWP Conference Services, 2360 Maryland Road, Willow Grove, Pa. 19090.

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For further information, contact Itel Corporation, Data Products Group, One Embarcadero Center, San Francisco, California 94111, (415) 955-0278.

ITEL

'More Than Locks and Guards'

DP Site Security Presents Unique Problems

By Robert Lawrence
Special to CW

Computer rooms and bank vaults have certain characteristics in common: both contain assets to be protected, both can be targets for thieves or malcontents and both are vulnerable.

However, computer rooms have several problems not found in vaults, including a higher personnel turnover rate, constant use of the DP area and significantly different surveillance techniques.

Computer room security, therefore, must be planned with DP's particular nature in mind. More than merely locks and guards are needed.

The lure the computer room holds for malcontents or thieves is not necessarily obvious. They may be seeking information valuable to competitors or foreign governments.

Sabotage a Possibility

Sabotage, a relatively new type of behavior to the office world but increasing in the world of high technology, is always a possibility.

In addition, computer equipment and supplies bring a good price on the black market.

Providing adequate protection for the computer room requires a combination of factors:

- Rigorously enforcing personnel screening procedures. No job applicant should be hired until all references have been thoroughly checked. Particularly in areas where shortages of trained people exist, the temptation to let need override procedures may be great.

One may think if one reference checks out it's likely the others will also, but that is not the case. An applicant may have been fired from another post for an offense that could prove costly to the new employer.

- Establishing a systematic supply control procedure with requisition slips matched against removal-from-inventory. Place one employee in charge of supplies and make unanticipated verifications of the procedures.
- Installing a vandal-proof card-control access system that admits only authorized personnel to the computer room. Specify a system with cards that cannot be duplicated.

Such a system will function around the clock, whether or not other departments are in operation.

- Maintaining good after-hours lighting in corridors and lobbies and setting up one "open path" to the computer room for multishift operations.

Further Protection

Other important security methods entail:

- Building good employee relations to reduce turnover. Companies with a highly mobile employee situation are more susceptible to theft and sabotage than companies with employees who have made an investment of time in the company.
- Keeping the lines of communication open. Employees will report theft and sabotage if channels are easily accessible.
- Evaluating remodeling and building moves to determine how they affect security. A move to achieve better use of space may open up security loopholes and create hazards.
- Checking with the local law enforcement agency about patterns of computer room theft and sabotage in the area. Learn what precautions are advised and what steps other companies have taken.

Lawrence is with Systematics, Inc. in Piscataway, N.J.

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Replacing General-Purpose CPUs

Parallel Processors Seen Big Data Bases' Solution

By Esther Surden
Special to CW

NEW YORK — Parallel-processing hardware systems may replace general-purpose computer systems for tasks requiring the search and maintenance of very large data bases, according to Curt L. Harris and Suzanne H. Roberts of General Electric Co.

General Electric has developed such a parallel processor for research purposes, they noted in a paper presented before the recent annual meeting here of the American Society for Information Science.

The processor, called the Associative Processor, if made available commercially would be used in conjunction with a minicomputer to search large data bases.

Current general-purpose computer systems, although far faster than manual methods, "are simply not designed to perform Boolean processing efficiently," Harris and Roberts stated. Conventional systems cannot search full texts of source files because the costs of performing such an operation are unacceptable.

Instead, the CPUs are equipped with data base management packages. "What they provide . . . is a capability to access full text in a limited way using a variety of surrogates which contain much less information than contained in the text itself," they stated. General-purpose computers "are designed to perform accounting tasks or solve mathematical equations," not search text, they added.

The Associative Processor designed by General Electric works with a Digital Equipment Corp. PDP-11/40 minicomputer and disk storage. Strings of characters or words are directly matched to strings of characters or words stored on the system's disk drive. Query terms with as many as 250 characters can be used.

Harris and Roberts noted that the Associative Processor can match text at "the rate of up to 500K char./sec."

Significant Benefits

Several significant benefits can be attributed to using parallel processing instead of conventional processing for these text searches, according to Harris and Roberts.

Since the text source file itself is searched, costly and time-consuming updates to the data base are eliminated. Also, any "textual file can be searched, even if it was not originally designed for a search and retrieval system. [Text] is searchable as soon as it is entered into machine-readable form."

The parallel-processing system is cost-effective as well, Harris and Roberts said. "Based on current prices, on-line full text search for multiple users could be provided at an estimated cost ranging from $200,000 to $800,000," they predicted.

3350-Type Disk Doubles Density

(Continued from Page 45)

through the use of improved electronics in the servo mechanism of the drive, Holtwick said. For users, the breakthrough means a lower cost, smaller space requirements and lower power consumption compared with other IBM-compatible drives, the spokesman explained.

The Model A2 costs $68,400, while the Model B2 is priced at $58,200. Putting a fixed head on these units adds $12,150 to their price tags.

Lease prices for these drives are $1,815/mo and $1,570/mo, respectively, on a one-year lease. The fixed-head option adds a charge of $294/mo to both systems.

These prices compare with IBM's purchase prices of $100,000 for 635M bytes of 3350 A2 storage, $124,800 for the A2F, $79,200 for the B2 and $104,000 for the B2F.

STC is located at 2270 S. 88th St., Louisville, Colo. 80027.

NMA Sets Schedule For Next Five Years

SILVER SPRING, Md. — The National Micrographics Association (NMA) has announced its schedules for its Midyear Meeting and Annual Conference & Exposition for the next five years.

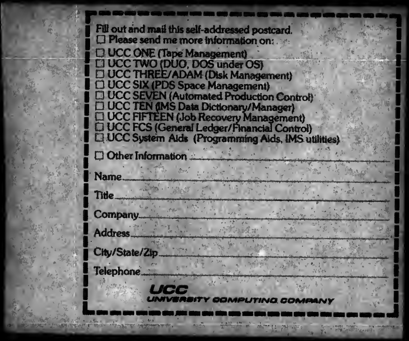
The Annual Conference & Exposition will be held in 1979 in Atlanta from May 8-11 and in 1980 in New York from April 22-25.

Other cities and years are Los Angeles, 1981; St. Louis, 1982; Atlantic City, N.J., 1983; Chicago, 1984; and Atlanta, 1985.

The Midyear Meeting, which NMA termed a "smaller, more intense meeting than the conference, providing a series of technical sessions," will be held in San Antonio, Texas, Nov. 6-9, 1979, and in Phoenix Nov. 11-14, 1980.

The meeting is scheduled for 1981 in Orlando, Fla.; Las Vegas, 1982; Kansas City, 1983; and Washington, D.C. 1984.

Additional information on the meetings is available from NMA's conference director at the association's headquarters, 8728 Colesville Road, Silver Spring, Md. 20910.



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Computerworld **CW-1278**

Cipher Adds 125 In./Sec Drive

SAN DIEGO, Calif. – Cipher Data Products has introduced a microprocessor-controlled, 125 in./sec tape drive aimed at what a spokesman termed the "large emerging market for high-speed, low-cost drives."

The Whisper Drive is part of Cipher's 900X series and incorporates a Z80 microprocessor. With the company's switching servos, the microprocessor is said to maintain total servo control during load and unload functions, thereby eliminating tape snap, whip or slack. Servo control is also maintained in power fail situations, even during high-speed rewind, according to a company spokesman.

Other functions of the microprocessor are said to include BOT/EOT sensing to eliminate tape overshoot; optical write protect, which eliminates the need for switches, solenoids and mechanical adjustments; and built-in diagnostics and aids that automatically test read-only memory and random-access memory logic indicating any fault conditions on front panel indicators.

The 19-in. by 24-in. drive draws 300 W, the company indicated, and also features LED light sources, a hard-chromed face read/write head and sapphire tape cleaner.

The drives cost $4,300. A formatter is also available for an additional $1,300, the company said from 5630 Kearny Mesa Road, San Diego, Calif. 92111.

CDC Offering Add-On For IBM 30 Series CPUs

MINNEAPOLIS – Control Data Corp. is offering add-on memories for IBM 30 Series systems at prices it said are below IBM's. In addition, the company claimed it can deliver them earlier than IBM.

The company's 33031 and 33032, for IBM 3031 and 3032 systems, respectively, are available in increments of 1M bytes each, for attachment to systems that presently have a minimum of 2M bytes of IBM memory. Another CDC add-on memory, the 33101, attaches to IBM 3033 systems having a minimum of 4M bytes and is offered in increments of 2M bytes.

A CDC spokesman said the add-on products will enable users of all the IBM 30 Series systems to increase memory up to 16M bytes. This compares to a limit of 8M bytes set by IBM for the 3033 and 6M bytes set for the 3031 and 3032, he noted.

The 33031 and 33032 add-on memory are both priced at $75,000 for the first 1M-byte increment and $61,000 for additional 1M-byte increments. Lease prices for the plug-compatible systems are $3,000/mo and $2,500/mo, respectively, on a one-year lease.

The 33101 costs $150,000 for 2M bytes and $260,000 for 4M bytes. Monthly prices (one-year lease) for these amounts of 3033 add-on are $4,500 and $9,500, respectively.

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IBM Printer Joins Offerings In 3600 Line

WHITE PLAINS, N.Y. – The IBM 3616 passbook and document printer for savings institutions and banks is said to be the fastest such unit in the IBM 3600 family.

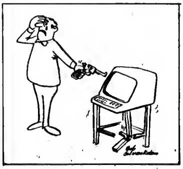
The unit is compatible with all current IBM 3600 finance communications systems devices and can print up to 100 characters on a wide variety of book sizes and formats. Featuring a bidirectional, 7 by 8 dot matrix print head, the microprocessor-controlled unit can operate at a maximum speed of 120 char./sec – four times faster than current 3611 and 3612 printers, IBM noted.

The 3616 includes a basic set of 94 alphanumeric characters, including upper and lower cases. Up to 16 separately addressable matrix patterns can be used to print special characters, and either of the two print stations in the unit can produce double-width, high-density characters for check protection highlighting or other purposes.

The unit, which attaches to a local or remote loop on an IBM 3601 or 3602 controller, can be intermixed with other 3600 family devices as needed, IBM said. For example, the company noted, two tellers with 3604 keyboard CRTs can share a 3616 printer.

Separate keys are used to identify which teller is using the printer. In addition, eight "guidance" lights, three user-programmable lights and five push-button controls come with the unit, IBM added.

First deliveries of the 21-in. wide, 14.2-in. deep, 10.7-in. high unit are expected to begin in the fourth quarter of 1979. The units cost $4,700, while a five-year lease will cost customers $185/mo, IBM said.



Library Finds Move From Paper to Fiche Easy

By Esther Surden

Special to CW

NEW YORK — Libraries can save money by generating catalogs of their holdings oncomputer output microfilm (COM) instead of paper — and they can do so without changing the software they are currently using.

That message was delivered by Katherine A. Boyes and M.M. Towai of Bell-Northern Research of Canada in a paper prepared for a recent meeting here of the American Society for Information Science.

Boyes and Towai pointed to their own experiences with COM to show how. In 1973, Bell-Northern research decided to create a "union catalog," or master catalog, of the combined holdings of its own library and the libraries of parent companies Bell Canada and Northern Telecom Ltd. Software called the Analytic Library Information Retrieval and Transfer (Alirt) system was developed to handle the task.

Alirt now runs on an IBM 370/168 and generates not only the master catalog for the three original libraries, but also for two related company libraries.

When the Alirt system was created, Bell-Northern printed its master catalog on standard, three-part paper, Boyes and Towai said. Catalogs of holdings sorted by author, title, subject and keywords had to be put together from the paper.

In addition, an overall catalog had to be made up for each of the libraries involved. Using paper was fine as long as the libraries' holdings remained small.

By 1975, however, all the libraries' holdings had increased dramatically. It took two "person-weeks" to put the catalogs into binders and ship them, they said.

Rerun Twice Yearly

This process was undertaken twice a year, when "the master cumulative file was rerun in its entirety." The Alirt system had to be updated monthly, which also was time-consuming using the paper system.

Some 15 binders were needed to hold the four main catalogs, and another eight were required for the four master listings. "Displaying the 15 binders for use by library patrons required a great deal of space, and space for all of us costs money," Boyes and Towai noted. In addition, paper costs were rising faster than ever before.

The library at Bell-Northern Research began to look for a solution to its problem, and it contacted several COM service bureaus. The librarians decided that working with microfiche would be a better alternative than printing the catalog on paper.

At first the library brought in the COM on a trial basis, obtaining a microfiche reader from a vendor "on loan." A heavy emphasis was placed on teaching the users how to find what they needed using the COM. A detailed instruction manual was also provided.

User reaction was enthusiastic, Boyes and Towai reported: "Patrons began using the microfiche regularly, rather than the hard copy still prominently displayed." By 1977, all output was COM except for the master catalog, which continued to be produced on paper so changes could be made to it.

Cost savings from using COM were significant. Had the 12 catalogs needed in 1977 been produced on paper, they would have cost $1,400. On COM, the library produced 25 sets (13 extra) for $313.

"These cost figures include only the output for Alirt — processing and other related costs did not change in any way . . . This was the deciding factor in our final choice of a [COM] service bureau. We chose the bureau with a system capable of taking our tapes as currently produced and indexing the fiche . . . there were no major changes required in our own software," they concluded.

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User 'Ecstatic' With Add-On

(Continued from Page 45)

turned out to be a hardware problem in the interface that took the system over the 4M-byte level.

"IBM could have run all the tests in the world, and it would not have shown up until the system went over the 4M core size. It was a really weird type of situation," he recalled.

Although Regan noted it is still too early to make a definitive comment on the performance of the Intel memory vis-a-vis the IBM memory, he did comment that his past experience with the Intel add-on memory for the 370/158 was very positive. "Intel's memory turned out to be more reliable than IBM's memory," he said.

"I've always enjoyed working with the Intel people because if they have a problem they tell you, and they keep you well informed of what they're doing," Regan continued. "They're easier to work with than IBM personnel because IBM personnel have more of an image to protect. For example, they don't do a lot of 'finger pointing.' [Intel] has very high-calibre people, and that really makes our job easier."

Notwithstanding this difference in approach, the two vendors have established what Regan called "a good working relationship." "They trust each other," he explained.

"IBM has been very cooperative, especially considering that we're the first" user of an add-on 3033 memory, Regan said.

Recent Developments In Data Networks

By Louis Pouzin

IN DEPTH
IN DEPTH
IN DEPTH
IN DEPTH

When distances between computers that communicate with one another are short (up to one kilometer) and these systems are located on the same piece of private land, users may employ a number of techniques for communications — telephone or telegraph wires, coaxial cables, optical fibers and even microwaves. Interfaces and signal handling are totally up to the owner of the installation.

When systems are separated by a sizable distance and data must be transmitted across public land, however, national or international regulations require that public networks or some private regulated networks be used. Organizations operating public networks are termed "public carriers" or "common carriers" or, more simply, "carriers."

From the advent of data transmission at the end of the 1950s until 1972, carriers did very little except talk about plans for future data networks. The only thing that was considered were digital circuit swtiching networks designed for carrying data.

The growth of private networks, which started in 1970, was the determining factor in convincing carriers that *something* was urgently needed. In a very unusual hurry, some of them began planning or building packet-switching networks, while others held to their original plans for digital circuit switching.

In circuit switching, a data path is established between a caller subscriber and a callee subscriber for the duration of the call. The data channel bandwidth, in terms of bit/sec, is constant per call, even if it is not fully used by the subscribers' data.

The transit delay (the time necessary for a bit to cross the network) is also constant and results from electrical signal propagation delays (10 to 50 msec with land circuits).

The basic characteristic of packet switching is that the data channel bandwidth between two subscribers is not constant, but varies with the subscribers' demands. This possibility is normally implemented by carrying data in the form of packets (about 1,000 bits), which are queued for transmission within one or several intermediate switching computers called "nodes."

The transit delay is substantially longer than with circuit switching (typically 150 to 500 msec) because of intermediate storage and queueing. It also follows a stochastic distribution.

Packet-switching networks implemented by carriers offer a virtual circuit service. This means an association must be established between a caller and a callee before data transmission is allowed.

This technique actually mimics a call in a circuit-switching network. The initial call may be avoided by using a variant of the service called a permanent virtual circuit.

Most private transmission networks using packet switching implement a simpler service called a datagram, which does not require any call set-up before transmission can take place.

Let's briefly examine the major carrier data networks presently or about to be available.

Electronic Digital Switching

Germany is the foremost European country in the use of Telex. The concern of the German postal, telephone and telegraph (PTT) authority was to modernize and expand its Telex network while providing new data transmission services.

Electronic Digital Switching (EDS), developed by Siemens, was chosen as the solution. It is a computerized digital circuit-switching network offering bit speeds from 50- to 9,600 bit/sec. However, the fairly old technology used for the switches restricts the number of higher speed circuits that may be maintained without unacceptable bit speed distortion.

Presumably, the bulk of subscribers will use 50 bit/sec for Telex or 600- to 1,200 bit/sec for CRT terminals. The first switch was put into public service in 1976. Since then several more exchanges have been connected.

Nordic Data Network

Denmark, Finland, Norway and Sweden have much experience in cooperation. They are presently building a synchronous computerized digital network offering permanent and switched circuit services.

Circuit speeds range from 50- to 9,600 bit/sec. The suppliers are home-based firms: Ericcson, Nokia and Elektrisk Bureau.

The operation of the network should begin in 1979; an expansion phase is planned through 1985.

CTNE

A number of years ago, the Spanish PTT and a collection of potential, large data communications users created a common subsidiary. Users were mostly banks.

A packet network, Compania Telefonica Nacional de Espana (CTNE), started operating around 1973. Presently two nodes are installed in Madrid and Barcelona. A number of concentrators provide for terminal and host attachment.

Services are basically terminal-to-host transmission and a message delivery service similar to store-and-forward Telex. A CTNE host offers a time-sharing service.

CTNE has two subsidiaries. One is a joint venture with the U.S.-based Computer Sciences Corp. called Ibermatica, which operates a Spanish extension of Infonet.

The other is a joint venture with Japan's Fujitsu Ltd. It should produce terminals for CTNE customers.

There is no doubt that the Spanish PTT has a strong commitment in the DP industry. Future developments are worth watching.

Tymnet

Tymshare Corp. started as a U.S. time-sharing service bureau. Acquisition of sev-

(Continued on In Depth/2)

IN DEPTH

(Continued from In Depth/1)

eral service centers and expansion of the customer base led to the development of a private transmission network, Tymnet, using telephone lines and minicomputers, which became operational in 1971.

Arrangements were later made so other organizations could connect their own computers to Tymnet. This facility became quite popular and partially turned Tymshare into a nonregulated carrier. Eventually, Tymnet became a separate subsidiary and got a carrier license from the Federal Communications Commission (FCC) in 1976.

Now eight European countries access host computers in the U.S. through their own PTTs and through International Telephone & Telegraph Corp. (IT&T) instead of doing it illegally through European extensions of Tymnet. Of course, the switching equipment is provided by Tymshare.

Tymnet presently has more than 200 nodes and is accessible in 117 American cities. This makes it the largest packet network ever built. Its switching technique is geared toward slow-speed terminals (110- to 1,200 bit/sec).

When a terminal dials in, a central network supervisor builds a logical bidirectional connection throughout the net between the calling terminal and the called host. Once established, the route is fixed for the duration of the call.

Packets exchanged between nodes contain an aggregate of characters from a number of logical connections. Host interfacing is taken care of by Tymnet in the form of a front-end converter called Tymsat.

For Europeans, Tymnet is primarily a way to access data bases located in the U.S. Multinational firms (i.e., American) use it to pass data and messages between U.S. headquarters and European subsidiaries. Computing services are also used on European hosts.

Tymnet is an interesting example of several logical networks sharing a single physical network. Indeed, a user can only be connected to hosts on which he has an account.

Furthermore, European access to American hosts operated by Tymshare is only possible through private Tymnet concentrators, while European access to American hosts which are subscribers to Tymnet is only possible through PTT-operated concentrators.

Incidentally, PTTs charge two to four times more than Tymnet for transmission costs.

An electronic mail service, Ontyme, is available from the U.S. and Canada, but not from Europe. Rumor has it that Tymshare feared possible PTT reprisals.

Telenet

This network is a commercial offshoot of Arpanet, the experimental network built by the U.S. Defense Department's Advanced Research Project Agency. Telenet Communications Corp. opened in mid-1975. It is a regulated domestic and now international carrier. Access points are located in 85 cities in the U.S.

Services offered are primarily terminal-to-host and some host-to-host traffic. Telenet indicated recently that traffic is increasing by 15% each month (a quick calculation translates into fivefold within a year).

Host interfacing is usually taken care of by Telenet, which provides conversion in the form of software packages in the host or in the net. Thus, the host interacts with the network as if it were a cluster of familiar terminals. Hosts can also use Telenet protocols for packet transmission and terminal handling.

The switching technique is geared toward fast transmission of independent packets. This could be construed as mostly suitable to on-line transaction or batch traffic exchanged with buffered terminals. Actually, practically all terminals are slow-speed (110- up to 1,200 bit/sec) and character-oriented.

Another notable trend is that nodes are clustered in "central offices," with regional star nets radiating from there. It will be interesting to see whether Telenet goes back to the old telephone system approach with local exchanges, central exchanges and transit exchanges, all hierarchical with quasi-fixed routing.

Telenet is accessible from Europe, but only through PTT concentrators. Actually, the same gear in each country is used indifferently, and at the same tariffs, for accessing Telenet and Tymnet. The European PTTs' policy is to treat all foreign carriers on equal footing — and to kill competition.

Telenet and Tymnet are called value-added networks (VAN) because they use circuits leased from other carriers, mainly AT&T.

Datapac

This network has been built by Bell Northern Research for the Trans-Canada Telephone System (TCTS), a telephone carriers association dominated by Bell Canada. It opened in mid-1977, wth accesses in Ottawa, Montreal, Toronto and Calgary.

Since then, extensions have been made to Vancouver and a few other cities.

Datapac is technically similar to Telenet and offers basically the same services. In addition, some IBM transaction and batch terminals are supported by concentrators.

Transpac

The French PTT is installing a public packet network. Announced initially for 1976, the opening date has been delayed several times; the last forecast was December 1978.

Initially, the network should contain 12 nodes and 13 concentrators, providing access in 25 cities. In principle, access is supposed to be available in any location in France. However, it remains to be seen whether this principle will work any better than in the telephone system.

Services to be offered range from 50 bit/sec up to 48K bit/sec. Access will be possible through Telex, telephone or leased lines. Most contemplated utilizations are connections between hosts and slow-speed terminals. Remote batch connections are being tested.

The switching technique is rather uncommon for a network of the present generation. Packets follow a fixed route, and there is no end-to-end error control within the network.

Euronet

In 1975, the countries of the Common Market reached a consensus to build a shared data transmission network for accessing data bases in Europe. Eventually, the European Commission was persuaded to place a contract with the PTTs.

A final decision was reached in favor of a Transpac copy, to be installed toward the end of 1978. This date is to be understood as six months after Transpac opens.

The network will have four nodes — in London, Paris, Frankfurt and Rome. These concentrators will be located in Dublin, Amsterdam and Copenhagen. The intended service is primarily terminal-to-host connection for slow-speed terminals. Host adaptations are being studied.

The initial implementation of Euronet is being funded by the European Economic Community (EEC). Supposedly the network could be upgraded on the PTTs' money to become a European public data network. However, there are predictable difficulties in implementing that plan.

A European net controlled by the PTTs and paid for by the EEC was certainly, from the PPTs' viewpoint, a better alternative than one or several more private nets. It is not as clear that a European net financed by the PTTs will be viewed as a better alternative than interconnecting national nets through domestic gear.

The European Commission has devoted some effort toward the definition of a common virtual terminal and query language for accessing data bases within the European community. There is no firm indication as yet that this goal is being achieved.

On the other hand, the idea of sharing data bases may require more maturation time in Europe. Indeed, in anticipation of the network service, some countries are buying and installing national data bases in order to satisfy domestic needs and possibly export services.

At least initially, Euronet appears to cause more data base duplication than sharing.

Compak

In the U.S., ITT is developing a VAN on which not much is known besides sales talk. It has been claimed that this network will solve all kinds of interconnection and incompatibility problems between various equipment.

In the spring of 1978, a first phase was announced which was to provide nationwide facsimile, with automatic conversion between incompatible terminals.

A few months later, it appears the service opening has been delayed by at least one year. Problems are said to be

(Continued on In Depth/8)

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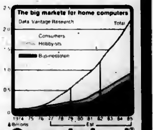

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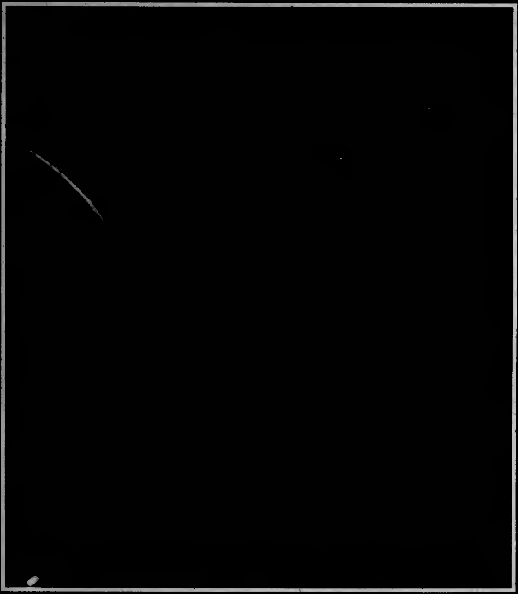
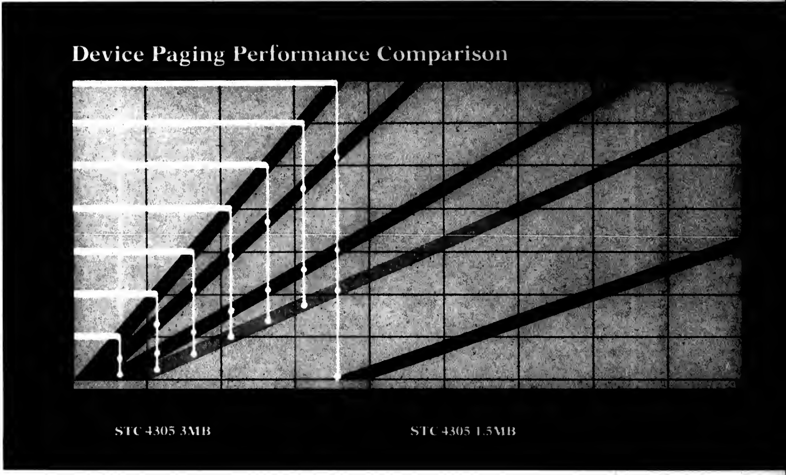


STC introduces the Solid State Disk: It gives you faster virtual storage paging for a fraction the price of the fastest drum.



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This latter feature, when combined with dual channel option, lets you share your Solid State Disk among processors with different channel characteristics. Add the

* 3.0 Mbyte/second and 6.0 Mbyte/second (aggregate transfer rates are options and require two byte wide interface from IBM.

powerful dual port capability, and you can attach to more processors, or gain concurrent access for a 2.0, 3.0, or 6.0* Mbyte/second aggregate transfer rate.

Lowest cost of ownership. When it comes to cost, Solid State Disk is a real penny-pincher. It costs less to buy, because it's easier to build. There are no critical mechanical parts to precision machine and assemble, just straightforward IC and PC board fabrication. In your data processing center, a typical Solid State Disk Configuration saves you 65% of the space required by the 2305, cuts power consumption by 60%, and reduces heat dissipation by a healthy 66%.

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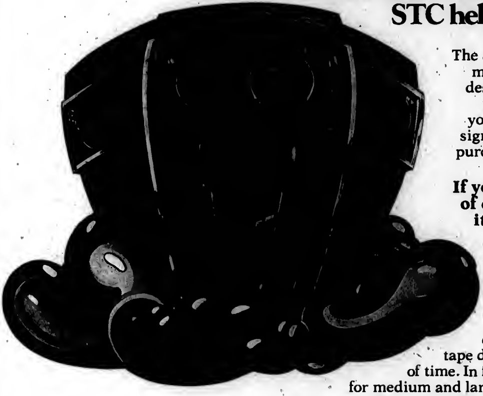
Solid State Disk: Just one of the ways STC helps you get more for less.



The Solid State Disk is just one of many STC products and services designed to help you get more productivity, and more useful life out of your IBM computer. And do it with significant cost savings in both purchase price and operating expenses.

If you have the impression that one of every three tape drives is ours, it's more than an impression. If it's ever seemed to you that everywhere you see medium and large-scale computers, you see our name, it's not just an impression.

Over the past nine years we've installed 22,000 tape drives—or about 30% of all tape drives installed during that period of time. In fact, today STC makes more tape drives for medium and large scale systems than anyone else, including you know who.

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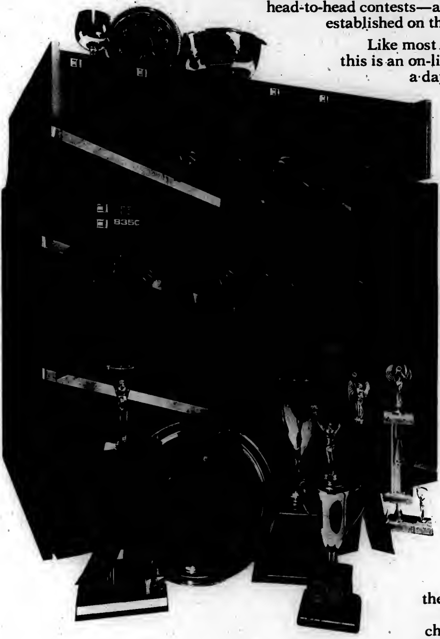
For instance, only STC drives incorporate SPAR, a unique, built-in diagnostics system that took 16 man-years to develop, and that allows our field engineers to perform all diagnostics and maintenance off-line, on-line, or in-line. Which is just one reason why national reliability studies show STC drives outperform IBM equivalents. So when you choose Storage Technology, you get more than performance. You get availability, serviceability, and reliability.

Now, to our customer (and you know who you are) who is still using STC tape drive 001: Come on. Give us a break. How long will a STC tape drive last? After 9 years, we still don't know. You see, the first engineering prototype we built back in 1969 is still being used by a California-based electronics firm. It hasn't had a service call in over two years. And our first production model, serial number 001, was field-converted from a 2450 to a 3470 (IBM 3420-7 equivalent) two years ago, and is also still being used heavily by one of America's largest retailers. So we're beginning to wonder if they'll ever buy a replacement. In the meantime, we'll keep giving them the same great service that's made our field engineers a legend in their own time.

Help, police! Creativity can sometimes make the difference between good service and great service. For example, can you imagine yourself asking the police to pick you up? That's what a couple of our field engineers did during Boston's driving moratorium last winter. An STC customer had a significant problem, and since the only legal way to drive was with a police escort, our people had to call for police assistance to reach the site.

Now, we obviously don't relish the image problems that might result from our FEs riding around in squad cars. So we're thankful that this was a rare event during the 3-day, 12-state storm. But it does underline why STC field engineers are popular enough with our customers to top the June **Datapro** report with a 3.6 rating.

Why the 8350 has never lost a contest. Fixed media disk users are a very picky lot. Many of them demand vigorous benchmarks before buying a winchester drive. The STC 8350 is used to winning these head-to-head contests—a pattern of success established on the very first installation.



Like most fixed media disk applications this is an on-line system running 24 hours a day, seven days a week. Anticipating typical new product problems, we arranged for this customer to provide computer time for engineering work. As it turned out, we didn't need even a fraction of a CPU second. During the 90 day test period, there wasn't a single hardware failure.

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How would the 8350 measure up in your environment? Why not put us to the test? As the leading independent supplier of high-performance fixed media disk drives, we can provide you with the product, the experience and the service resources to satisfy your most challenging requirements. We'll even guarantee it. In writing.

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STC Systems Engineers can help with answers to questions like these to squeeze more mileage out of your existing storage equipment, and help you plan for more efficient system growth. They've helped our customers solve a wide range of storage problems under virtually every conceivable combination of CPU, operating system, and job mix. Their experience is now at your disposal in the form of free software packages.

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Before you wed your CPU to an add-on memory, check out their hand holding. You know that when it comes to add-on memory, installation and service are as important as hardware.

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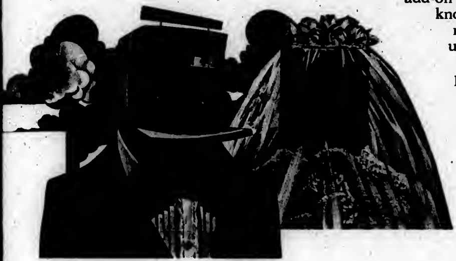

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IN DEPTH

(Continued from In Depth/2)

technical.

This company has been created as a subsidiary of IBM, Comsat General and Aetna Life and Casualty. Each one owns a third of Satellite Business Systems (SBS).

The FCC has allowed SBS to offer a domestic digital tansmission service using satellites. The target market is 200 major companies in the U.S. They would be offered a private network service catering to integrated communications (telephone, facsimile, teleconferencing and data exchange) with a much higher bandwidth than would be feasible or economic with land lines.

Presumably, IBM is developing interfaces between the communications gear and various terminals, including PBX telephone exchanges. Earth stations would be located on private premises.

This service is scheduled to open with 24 earth stations in the beginning of 1981. Extensions could reach 600 earth stations over five years. Earth stations will be rented from SBS.

Presently, SBS is only a domestic U.S. carrier, but some feelers have been put out to foreign carriers in view of a possible cooperation. In Europe, some propaganda purports to amalgamate SBS and IBM and paint them as the absolute evil. It looks as if the prospect of cheap and abundant worldwide communications were ominous to some organizations.

Bell Data Network

AT&T's plans for a data network were leaked out over the past three years. Finally, in June, it officially requested the FCC to declare its position regarding a future Advanced Communications Service (ACS).

AT&T's legal status is quite entangled. On one hand, it is allowed to offer only FCC-regulated communications services; on the other hand, a Consent Decree with the Justice Department bars AT&T from getting into the data processing business, even through a separate subsidiary. Thus, unless the Consent Decree is revised, ACS can only be cleared legally as a regulated communications service.

As opposed to the traditional carrier approach, ACS will not offer transmission services per se. Rather, it will offer terminal support and message management. Terminal support will fall into several classes:

- Class 1: Asynchronous start/stop Ascii terminals, 110- to 1,800 bit/sec (e.g., Teletype Model 35).
- Class 2: Buffered terminals, same code and speeds as Class 1 (e.g., Hazeltine Corp. Model 2000).
- Class 3: Asynchronous start/stop polled terminals, 135.5 bit/sec (e.g., IBM 2740/2).
- Class 4: Synchronous polled terminals, 2,400- to 9,600 bit/sec (e.g., IBM 3270).
- Class 5: Batch terminals under Binary Synchronous Communications (BSC), 2,400- to 9,600 bit/sec (e.g., IBM 2780).

The CCITT X.25 interface will be available as one of the synchronous procedures. A number of network parameters controlling terminal handling and data transmission will be customized and can be adjusted by the customer through specific commands.

In addition, ACS will offer text editing, message storage and management and data collection functions.

The target date for the first experimental users is the end of 1979. Thus, some time remains before the whole gamut of network capabilities is uncovered.

Unquestionably, ACS is intended to be a substitute for communications-oriented products such as front ends, concentrators, multiplexers, terminal controllers and even terminals since AT&T is marketing its own terminal line called Dataspeed.

American VANs (such as Telenet or Tymnet) and equipment manufacturers are likely to be in competition with ACS. On the other hand, there will be ample opportunities for the marketing of ACS-based products, which may be profitable compensation.

Comparing Tariffs

Every user would like to compare network tariffs the same way he compares railways or airlines tariffs. In fact, however, it is not so easy.

Data networks' tariff brochures contain a large variety of tariff components, which make an overall compari-

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son quite elusive. Let us take some samplings.

Telenet Tariffs

The cost of using Telenet is $60 per kilopacket. A packet can contain 1 to 128 characters, depending on the way the user fills it.

For the use of a dial-in port at 110- or 300 bit/sec, the hourly charge is $1.40 in high-density areas and $2.40 in low-density areas for the first 800 hours; $1.40 and 90 cents, respectively, for 800 to 1,400 hours; and 90 cents in both high- and low-density areas for more than 1,400 hours.

Telenet allows a discount varying from 20% to 50% when the monthly bill is between $5,000 and $18,000.

Transpac Pricing

In French francs (FF), currently worth 23.5 American cents each, the cost features of Transpac are:

- .05 FF per 1,024 characters (by fractions of 64 characters).
- A monthly subscription fee of 270 FF (up to 300 bit/sec).
- Use of dial-in port: .05 FF/min.
- Use of a virtual circuit: .01 FF/min (up to 1,200 bit/sec)
- Minimum charge per call unknown, but no more than 0.31 FF.
- A 40% to 80% discount on volume and virtual circuit time charge during off-peak hours.

Euronet Costs

In Belgian francs (BF), which are currently equivalent to 3.4 American cents, the cost features of Euronet are:

- .06791 BF per segment of 64 characters.
- Use of dial-in port: 1.36 BF/min (up to 1,200 bit/sec).
- A 33.3% discount on volume charges and 20% discount on time charges during off-peak hours.
- Unannounced national access charge.

As one can infer from these three examples, there is no possible across-the-board comparison. It is clear that billing will be very sensitive to user traffice patterns. Cost projections based on raw data volume may be totally unrealistic when messages are chopped short.

From a general point of view, tariffs illustrate very well the chaotic and parochial carrier approach to international communications. A close look at international tariffs would reveal "tariff walls" — overcharges decreed by the European PTTs to prevent domestic traffic from going abroad.

The Standards Issue

The widespread expansion of long-haul data networks makes it desirable to take advantage of the diversity of computing services already available on a large number of hosts. Furthermore, new services germane to the very existence of networks are becoming available (electronic mail, teleconferencing, environment monitoring).

Thus it appears all too natural, from a user standpoint, that most computing services be accessible from any terminal and that data or programs move across systems boundaries.

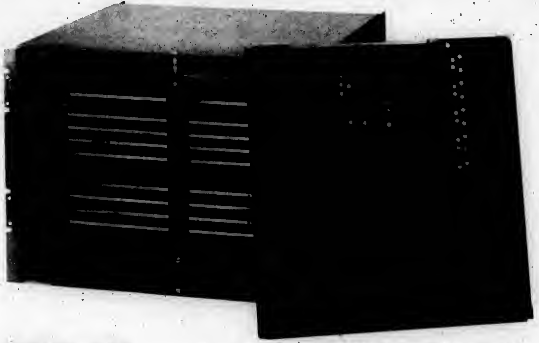
Interconnecting systems and terminals require a highly sophisticated level of common conventions, which are termed "protocols" in the network jargon. In order to avoid specific adaptations, it is desirable that international standards be agreed upon and applied. In the computing field, however, standardization has remained razor thin because of the business competitive nature and because of the lack of motivation from suppliers to come to any agreement. This situation is now changing very rapidly because users and carriers are pressuring suppliers for the capability of achieving a much larger degree of interworking than in the past.

Two major standard bodies are working out network standards: The International Standard Organization (ISO) is a federation of national standard bodies. The Comite Consultatif International Telegraphique et Telephonique (CCITT) is a carrier club.

Since 1975, ISO has produced a set of standards for the control of a "data link," a logical channel, for point-to-point and multipoint circuits. These standards are known as High-Level Data Link Control (HDLC).

A subcommittee (TC 97/SC -16) this year began studying standards for "open systems interconnection," the requirements for heterogeneous systems to interwork. This activity is cer-

(Continued on In Depth/10)



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(Continued from In Depth/9)

tainly the most significant step taken by ISO toward comprehensive DP standards.

Since 1976, CCITT has produced a set of standards defining the interfaces between user equipment and public packet networks, for transmitting packets and for handling asynchronous start/stop terminals between 50- and 300 bit/sec. This set is known as X.3, X.25, X.28 and X.29.

The historical distinction between communications and DP is fading; the new communications services offered by public networks are actually DP systems. Thus there is some growing overlap between ISO and CCITT. So far the cooperation between these two bodies has been rather flimsy.

Among the networks reviewed earlier, Telenet, Datapac, Transpac and Euronet are offering CCITT interfaces, or more precisely their own interpretation of the standards. In addition, they have their specific facilities which are not standardized. There are yet no well-defined interface specifications for packet network services guaranteed to work internationally.

The other networks still do not have CCITT packet interfaces, but they say they will. EDS and the Nordic net use the X.21 interface defined by CCITT for digital switched circuits.

Building Gateways

In the absence of standards put into practice, the only way to achieve interworking between networks is to build adapters, also called protocol converters or gateways.

A gateway acts as a middleman between two data networks. Either side of a gateway conforms to the protocols and interface requirements of either network. In between, data and control information are mapped from one network conventions into the other network conventions.

This is easier said than done, as the mapping is not always straightforward. It usually requires some approximations and may introduce restrictions.

Passing packets between two packet networks is not a sufficient condition for providing a useful interconnection. The target is to allow interworking between users and DP systems of either network.

Data transmission protocols are only a lower "layer," and additional upper layers of protocols are needed. When these upper layers' protocols are different, it is necessary to perform an appropriate mapping in the gateway.

For example, if we want to transfer a file from one distributed processing system to another across two packet nets, mapping packets is not sufficient if there is no common file transfer protocol. In this case, a gateway should be capable of receiving a file and retransmitting it.

A possible implementation technique would be to simulate a line printer on one side and a card reader on the other, with an appropriate insertion of job control commands. If the structure of the file is more complex than sequential, additional conversion functions would become necessary.

As one can see, there is no general solution to the problem of interconnecting networks. Gateways are built for specific purposes.

The Security Problem

There are many ways in which public transmission systems can be tapped. Modifying data for protection is complex, but can be achieved with a little bit of sophistication.

However, all penetrations become ineffectual when data is totally meaningless to the opponent. Thus, encryption techniques are used when good security is required.

In its basic form, encryption is obtained by an algorithmic transformation of plaintext into a ciphertext. A key is used in the algorithm so that the

(Continued on In Depth/12)

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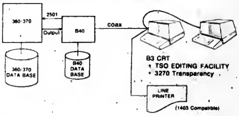
And the B40 does this independently, so your 360/370 is more available. Batch jobs are submitted from CRT's for compile or execution. Meanwhile, other jobs can also be submitted from your other card reader.



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(Continued from In Depth/10)

reverse transformation is feasible only if one has the key.

Encryption can be performed on a physical circuit between two pieces of equipment. In a packet network, this would mean that ciphertext would be turned back into plaintext in every intermediate packet switch point. Security would then depend on the potential access to the contents of a packet switch. Unreliable personnel or electromagnetic tapping might reveal data in transit.

A more secure form of encryption is performed end-to-end. In other words, ciphertext is sent to the data network and delivered as ciphertext to its destination. However, encryption cannot apply to packet headers because then the network could not carry them.

The security of an encryption scheme is based on the assumption that only the sender and the intended receiver(s) of a message have the key. Thus, there must be secure means to transmit keys and protect them.

A basic principle is that keys are never sent or stored as plaintext. They are also encrypted. When used, they are deciphered within a secure piece of equipment which cannot be tapped because of its specific design.

In the end, there must be a secure distribution of encrypting keys by courier or by diluting keys into masses of data transmitted through a multiplicity of independent channels that no opponent can tap altogether.

An encryption technique has been proposed for the simplification of key management. This scheme uses two keys, one for enciphering and one for deciphering. Let us call these keys P (public) and S (secret).

In order to send a message to Peter, anyone can use the P key, which is publicly known (like a telephone number) as being Peter's public key. Then the resulting ciphertext can be deciphered by whoever has the S key — and that person is Peter.

The reverse property of this scheme is no less intriguing. Let us suppose that Peter sends around a ciphertext resulting from his secret key S. The only way to get back the plaintext is to decipher with the P key, which is a proof that the message comes from Peter, because he is the only one capable of having produced the ciphertext with the corresponding S key.

Both properties may be superimposed to send authenticated messages to designated recipients. These messages may then carry keys to be used temporarily between two correspondents, using a one-key technique for each direction.

Frequent change of keys is a way to avert penetration. Thus, permanent keys are used to exchange temporary (or session) keys.

As protocols, encryption schemes must be commonly agreed upon to be usable. Standards are needed.

The only step in that direction so far has been the adoption by the U.S. National Bureau of Standards of the Data Encryption Standard (DES) proposed by IBM. A one-key scheme that uses a 56-bit key to encipher 64-bit data blocks, it was designed to fit in a chip.

Louis Pouzin is currently director of Project Pilotes at the Institut de Recherche d'Informatique et d'Automatique (Iria) in Rocquencourt, France.

Pouzin has served as director of Cyclades, an experimental computer network linking universities and research centers in France, and was also DP manager at Chrysler France.

His earlier experience included being in charge of Meteos, a real-time operating system for the French weather bureau, and working on the team which built the CTSS operating system as part of Project MAC at MIT.

Looking back.
And ahead.

All indications have it that 1978 will go down as another banner year for the computer industry. User spending for 1978 should at least match the IDC — projected $42+ billion, up 15% from 1977. Budgets in almost every major category show increased growth over 1977, and 1979 is shaping up to be a repeat performance.

Our December 25/January 1 Combined Issue Special Report takes a look back at the year in computers, as well as a look ahead for 1979. The *Computerworld* editorial staff will take a break from the holiday season just long enough to give you some hindsight and foresight on topics like:

- *The impact of inflation on computer use and configuration*
- *User-vendor relations*
- *Market trends — products projections for '79*
- *The year in court — IBM and Memorex*

If you're concerned with the trends in the computer industry, you won't want to miss our Year-End Review and Forecast. And if you market products for the computer world, here is a good place to advertise. Color close is December 8; black and white close, December 15. Your *Computerworld* representative can give you all the details, and assistance in ad planning. Or, to reserve space, call Terry Williams at (617) 965-5800.

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The secret to effective project management is a well-tuned organization, Toellner believes. Last week the developer of a project management system suggested the changes needed on the corporate, DP and user levels. This week he concludes by addressing the specifics of the project cycle.

IN DEPTH IN DEPTH IN DEPTH IN DEPTH

Project Management: A Formula for Success

Part 2

By John D. Toellner

The project manager needs to concern himself with the scope of work for the total project, rather than just the piece that surrounds the computer. The quality of the estimate of a project's cost will largely determine the credibility of the project team when the work is complete. Schedule slippages and cost overruns plague most organizations. One of the major reasons for this is the absence of good estimating techniques.

A series of principles need to be considered in putting together an estimating process that works:

- The basic problem in systems and programming is that estimates are too low. Any technique must be capable of producing larger estimates.
- Estimates done at the detail level will always have more hours in them than estimates done at the summary level. Detailed estimating is therefore needed.
- Annotation of each line is essential to justify the source of the numbers.
- The estimating process is clerically tedious, and assistance must be provided to make any technique enforceable.
- Estimating teams (two to three persons) produce better estimates than a person working alone.

Any estimating process must of necessity closely follow the project life cycle. One approach is to create an extensive checklist based directly on the life cycle so that after an estimate is prepared, the estimates can be used by the project team to control the execution of the project work.

In preparing such a checklist, each individual work item and deliverable should be identified so the project estimator can establish the number of hours necessary to do each task, and, as a consequence, all of the project work.

When a detailed checklist of several hundred line items exists, senior people in the department can use their experienced judgement to create typical times for the length of each of these steps. These typical times help the estimator approach the estimating process in a comprehensive manner. Without guidance, the estimator can become frustrated by the line-by-line decision process.

Once the initial estimates using the checklists have been prepared, they need to be factored by consideration of key environmental factors that cause some projects to take longer than others. Some of the environmental factors to be considered are junior vs. senior project teams, knowledgeable vs. naive users, complex vs. simple systems, software newness and machine turnaround. Up to 20 meaningful factors can be identified. These factors cause plus or minus percentage adjustments to be made.

Once man-hours have been calculated through the estimating process, then converting them to dollars is a straightforward process if standard billing rates have been established for the department. Outside purchases and the use of outside resources, as well as computer time, are usually added to the labor cost estimates.

When using standard checklists, it is significant that the project manager be permitted to remove from the checklist any items that do not apply to his project, but at the same time is obligated to write in the tasks unique to his particular piece of work. The result is an estimate based on the actual work that will be performed.

It has been my experience that the best estimates are produced by estimating teams comprised of the project manager, one senior analyst and hopefully a key user so users can see why systems take so long to implement. Considerable discussion on each checklist item takes place, resulting in an estimate that is well thought out.

I am familiar with more than 40 firms using the approach described here, and these firms have reported that the estimate vs. actual comparisons have been in very close agreement. Currently under consideration is a project to create a nationwide data bank of estimating times to validate the typical times to execute each task. This project is possible because each of the firms use checklists that are quite similar.

Project managers cannot be expected to immediately know how to use the estimating process, so a training course is essential. A daylong course that is workshop-oriented is recommended to make sure that each person who will have estimating responsibilities can demonstrate his proficiency.

Estimates cannot be "frozen in concrete" at the beginning of the project and left unchanged when the scope of the project work changes radically. At major milestones in the project life cycle, a new estimate must be prepared when better data is present on what the user *really* wants and after some of the design work is complete.

Logical points in a life cycle are after the feasibility study, preliminary design (external) and program design (internal). If the new estimates are substantially larger than the latest approved amount, then management approval of the new budget is needed.

An estimating process normally produces man-hours or man-days of the analyst/programmer time needed to perform the necessary project work. How does one decide whose hours to include in the estimate? It must be the same as the time-reporting system in existence.

For example, if it is the practice of the organization to have users charge their time against the project, then the estimating process must estimate user time. If, on the other hand, users never charge for time, then this time should be not included in the estimate.

Once the man-hour estimate is in existence, the manual scheduling of each individual on the project team should take place up to the project's next major milestone. The manual scheduling process requires hard thinking on who is qualified to do which task, the sequences in which the task must be done.

When the manual scheduling process is complete, then the project information is ready for input to a piece of software, if one is present. If project control software is used by the organization, the fine tuning of a project plan by the software can be accomplished quite rapidly. The software's great strength is that as changes take place on a weekly basis, it can very rapidly update the schedule with a minimum amount of effort required from the project manager.

One of the major difficulties for the planner of project work is to effectively communicate what he has in mind to those who will execute the work. This is a real communications challenge and is often underestimated.

(Continued on In Depth/16)

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IN DEPTH

(Continued from In Depth/13)

A substantial amount of hourly and daily supervision by the project manager is required to make sure that people understand what he is asking them to do and that they are headed in the right direction.

The planner is normally the estimator, and one specific output of his process is the detailed checklists which were used to create the estimates. These checklists identify the work items and deliverables the planner assumed would be produced when he put his estimate together. What is needed, then, is written material to hand to the project team so the project manager is freed from the hourly and daily supervision that is necessary if items are handled orally.

The term I use for this detailed, task-level guidance is "performance standards". A performance standard should exist for each task in the standard project life cycle, and it should be supplemented by summary descriptions of tasks that are written in or added to individual projects by the project manager.

The guidance material for senior personnel should be quite succinct, as it is safe to assume they will understand how to produce a high-quality end result when not much more than the task's deliverables are shown to them. For intermediate and junion personnel, however, more procedural guidance is essential if they are expected to produce what the project planner had in mind.

It has been my experience that including in the performance standards a series of specific forms that are easy to complete simplifies the communication of what to do. The advantages of a forms orientation were discussed last week.

Another important component of a good performance standard is an example for each of the deliverables the planner is asking the project team to produce. Development of examples is quite difficult, but pays good dividends, especially in communicating the level of detail expected by the assigner of work. I have had many years of experience in writing procedures for managing project work, but I have never found a better vehicle to communicate how detailed something should be than to provide the individual with an example.

The performance standards cannot be expected to convey the expected quality of a particular design. The most one can hope for is to guide the process used to produce the end result and the format the end result takes. If the performance standards accomplish these functions, then an experienced individual looking at these deliverables can quickly assess whether the design thinking behind the deliverables was appropriate.

Measuring Performance

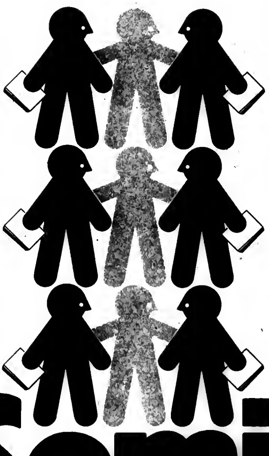
Many organizations today are becoming increasingly concerned with performance measurements to get a better handle on the productivity of their staffs. When conventional industrial engineering approaches are applied to data processing, we find the individuals most rapidly going to the keypunch department, followed by the program coding. The reason for this is that these are the items most easily measured.

What is needed, I believe, is a performance measurement for all the tasks in the project life cycle, not just for those which are easy to measure. Unfortunately, many of the tasks do not produce the kinds of deliverables that can be counted, so we must turn to some other approach if we wish to measure performance.

When we talk about measurements, three variables are required: time, cost and quality of the work. By time, we wish to measure whether a project will be completed in an established calendar period. Cost refers to the man-hours and dollars consumed. The quality is involved with the workability of the end deliverables of the project work.

The ability to measure an item is directly related to the existence of a quantitative measure prior to performing the work. Performance can never be measured unless the actual result can be compared to a plan that was prepared before the work began.

To measure the performance of the resources used on the project, it is necessary to have an estimate of man-hours (or dollars) and a weekly time-reporting process which feeds back the



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number of hours or dollars that were actually consumed. By making comparisons at the task, subphase, phase and total project levels, we can monitor the performance of a project team in regard to its budget.

By using scheduling techniques that utilize the estimated man-hours, the calendar dates when each of the key milestones of a project are expected to be reached can be developed. A progress-reporting procedure that reports when milestones are actually reached permits the measurement of the project team in regard to schedule performance.

When performance standards exist to describe the approach to be taken and the appearance of each task's end result, then the actual deliverables can be matched against these standards to see if the quality of the system is acceptable.

Therefore, in summary, we can see that performance measurement requires the development of a detailed man-hour estimate, a calendar schedule when each of the major milestones are reached and a set of performance standards that identify what acceptable deliverables will look like. A weekly time-reporting system, a weekly progress-reporting procedure and the availability of the actual deliverables are needed. By the use of these information flows, it is quite possible to get very realistic measurements of the budget, schedule and quality of all the systems work. Good historical records permit the measurement of performance of individuals and of the group as a whole.

Capturing User Requirements

It is my opinion that the thorough and careful documenting of user requirements is the single most important series of tasks in any project life cycle. The appearance of "user changes" during the detailed work such as programming are often really requirements that were missed, rather than users who changed their minds.

If user requirements were 100% documented at the beginning of the life cycle, the design process, although challenging, would be a very straightforward matter. Further, good user requirements eliminate the need for a rash of enhancements that pick up items missed in the original project.

In capturing user requirements, two basic assumptions are made:

(1) The user, down deep, does know what he wants in the new system.

(2) The user has no organized process for documenting his requirements in a form the systems function can use.

These assumptions pose a substantial challenge for communicating, and it is unrealistic to expect all user organizations to simultaneously improve in the near future. As a consequence, the burden falls on the systems group, which must improve its communications skills so comprehensive and meaningful requirements are reduced to writing.

It has been my experience that user requirements can be successfully captured in a series of four steps. Step 1 is a process dedicated to educating the analyst, who is responsible for capturing the requirement. He needs to study documentation on the current system, be it manual or automated, and to spend enough time in the user organization to ensure that he thoroughly understands how the user does his business.

Step 2 involves the preparation of a highly detailed checklist of every feature, function and transaction that he anticipates the user might require. If an item is not on the checklist, it will not be discussed and a requirement will be missed. This checklist, which will be used as an interview guide for the next step, needs to be reviewed with the user prior to execution.

(Continued on In Depth/18)

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(Continued from In Depth/17)

Step 3 involves detailed interviews, with a substantial volume of information generated by the user and documented on the spot. Each item on the checklist is turned into a question and the user is asked how he wishes the new system to respond when that function occurs. His response is recorded and fed back to him.

If the understanding was inaccurate, the user corrects the interviewer on the spot. The interview proceeds item by item, resulting in a paragraph of specification of the user's needs for each item on the list.

Step 4 is the process of editing the requirements captured in the interviews, which often contain duplications and incomplete thoughts. The editing is followed immediately with a detailed paragraph-by-paragraph review with the users to make sure they both understand and are committed to every paragraph of the documented requirements.

It is recommended that, at the end of the life cycle, the project manager demonstrate to the user how the system handles each of the requirements. The requirements tell *what* is required. The design determines *how* it is handled.

With well-documented user requirements, the project team seldom hears complaints that unwanted features show up in systems while important items are omitted.

Conventional Methods Ineffective

My experience in dealing with a large number of systems and programming groups indicates the time has come when the emphasis on user involvement in projects has matured to a point that it can be considered an absolute necessity. Once an organization comes to the conclusion that this involvement is both needed and desirable, the challenge is to create a structure that will cause it to take place all the time.

Conventional methods for involvement are generally only partially effective. Often, full-time users are assigned to projects, either as project managers or as team managers. This can be a bit awkward at certain times during the project life cycle — for example, when the work content is much too technical to permit the user to participate and he feels lost.

Having top executive managers review the projects on a weekly or a monthly basis is also awkward. The project team invests a substantial percentage of its time in preparing for these meetings, and the top managers are often not prepared to apply experienced judgment on redirecting the design effort.

In short many of the processes used to involve users do not work too well.

Regular User Reviews

To accomplish a more practical level of user involvement, I assume that a project life cycle has been established which defines the tasks necessary to create all the project work and that each of the tasks produces some form of deliverable that can be examined to show how the design or administrative activity is unfolding. User-oriented reviews can be inserted at key points in the project life cycle.

A practical way to set up these reviews is to take the deliverables that occur in the project life cycle and cluster them into a series of batches that end at the key milestone points in a project. For example, after capturing

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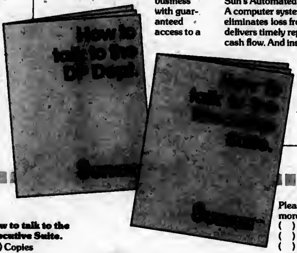

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the user requirements, a logical milestone has been reached; at the end of the feasibility, or advisability, study, where alternative approaches have been identified, another logical milestone is reached. Others can be identified during both the design and implementation phases.

If a quality review is structured at the end of each batch of work, it will be observed that many of these reviews contain materials that are easily understood by the user and, as a consequence, his active participation is practical. The quality review process, then, becomes an ideal vehicle for accomplishing active user involvement on all of the activities of the project with a minimum expenditure of the user's time. This is a very desirable combination.

Once this review process is set up, authority must be given to the user reviewers to block the project's progress if — as evidenced by the deliverables — the deliverables do not satisfy the agreed-upon requirements. The project team must redo the deficient results. Memo reviews tend to be ignored.

Typical Decisions

The typical decisions in which users participate involve making sure:

- The scope of the requirement is practical and unnecessary and expensive features are not being added to the system.
- The better broad project alternatives (whether to go batch or on-line, for example), have been thoroughly evaluated and the most practical alternative chosen.
- All the inputs and outputs of the system are appropriate and the specifications for creating the design do, in fact, include all of the agreed-upon user requirements.
- An implementation plan has been established.
- The user manual contains clear material.
- The users will be adequately trained for their new role.
- The systems test is thorough and can flush out any flaws that might exist before the system is turned on.

With active involvement in the review of the deliverables for each of these important activities, the user can make sure his interests are protected while spending a minimum amount of time associated with the project.

The Enforceability Issue

In considering enforceability in project development, a very delicate line must be trod. Systems analysts and programmers are professionals, and the process cannot be so rigorous that they feel like they are being treated like clerical personnel.

On the other hand, without an enforceability structure, the key activities in the development of systems won't happen, and the organization will end up with badly designed and badly documented systems. What is a workable compromise between these two extremes?

In designing an enforceability process, the first question to face is, "What do we want to enforce?" I think three significant items are involved. The first is to make sure the standards of the department are being used. This includes design standards, such as top-down or structured techniques, and documentation standards that call for a consistent way to document the results

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(Continued from In Depth/19)

of the design work.

The next issue is quality — to make sure that the design that is unfolding is true to the user requirements and that the creation of a technically efficient system is happening.

The third item is to ensure that project planning is taking place so management gets accurate information on how much the system will cost and how long it will take to complete.

Once we have decided on what we are going to enforce, then we must face up to the question of how we are going to make this happen. My suggestion is that the work in the project life cycle be batched, with each batch containing a series of logically related tasks so the project can progress batch-by-batch through the life cycle.

By having each batch conclude with a meaningful review, the project manager can withhold the release of the next batch until he is certain the deliverables produced by the previous batch are acceptable. This release mechanism becomes a simple but effective way to accomplish the mechanics of enforceabiltiy.

Essential to making the whole process work is that the individuals performing the quality review be given the authority to block the project's progress and send the project team back to the drawing board to correct deficiencies before the project manager releases the next batch of activities. The quality review process then becomes the key element in the enforceability scheme.

Because of the importance of the quality reviews and because of the policy that work not progress to the next batch until the previous batch is approved, an auditing process by the DP management is essential to make sure these quality reviews are functioning. If the quality reviews are properly functioning, then the enforceability process will take place.

Design Freezes

Another key item needing enforceability is design freezes. Design freezes are generally recognized to be helpful to the DP team, but they are often viewed with great suspicion by the user.

To make a design freeze process practical, it seems obvious that thorough user requirements must be developed and approved by the users early in the project life cycle. If it were possible to capture 100% of the user requirements at the beginning of the life cycle and then to assure that each would be included in the design, then issuing a design freeze toward the middle of the life cycle becomesd a practical matter.

If the user requirements are either nonexistent or incomplete, design freezes become impractical because they lock out essential features of the system.

One of the major reasons for schedule slippages and cost overruns on projects is that additional features and functions are introduced to the systems design as deep in the life cycle as detailed programming or, worse still, during implementation. Design freezes provide a way to identify the add-on requests so they can be treated as follow-on projects after the original project has been put into production.

I believe the design freeze should occur approximately at the 50% point in the expenditure of project funds, which is usually where all of the externals to a system have been designed and agreed upon, but the program design and programming activity has not yet started. At this point all the user-oriented facets of the design are complete.

Two-Level Freeze

It is often practical to issue the design freeze at two levels. The preliminary design freeze, which occurs a bit earlier than the final freeze, requires that major features and functions not be considered a part of the current project but, instead, as follow-on projects if approved by the management group.

The second design freeze suggests that nothing other than trivial details be added to the project once this freeze has been issued.

After the design freeze, if the user wishes to demand it, it is perfectly acceptable for the project manager to stop his project and estimate the balance of the work including the requested changes. If the sponsor of the project is willing to add the dollars and the calendar time to incorporate these changes, then the project manager

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should be quite pleased to proceed with the larger scope project. The key element here is that the budget and schedule must be consistent with the scope of work to be performed.

I have found that design freezes announced well in advance are accepted by both the user community and the project team, eliminating one of the major reasons why projects often come in over budget and late. The enforceabiltiy is keyed to the quality reviews and poses no problems.

Staff Training

Every organization recognizes the need to train its analysts and programmers to gain the skills necesary to do a professional job in the building of new systems. However, it is often difficult to be precise on exactly the type of training that will best prepare each individual to perform the needed work. Training needs fall into the two general classifications of short-range and long-range.

Short-range training needs are most frequently identified by the project manager when he compares the skill level of people assigned to him with the tasks that he is asking them to execute. The speediest method is to merely ask the individual whether he feels comfortable in executing all of the work items requested of him by the project manager.

If the individual answers that he does not feel adequately trained to carry off the work assignments, the project manager is responsible for initiating appropriate action to see that the training takes place. This process should be repeated at each stage of the life cycle.

Longer range training identification is often done by the training director or coordinator, and again it is useful for him to examine all of the tasks in the project life cycle by broad groupings to identify the skills needed of the analysts and programmers on the staff. In addition, it is anticipated that he will perform a skills inventory of each individual on the staff and lay out individual training programs to bring staff members to the level of professional proficinecy that permits them to develop high-quality systems.

The alternatives for accomplishing the training are varied and depend on the size of the organization. For a larger group, in-house instructors frequently represent an effective way to accomplish the training because specific courses can be tailored to the unique requirements of that one organization. This assumes the individual instructor is skilled in modifying and teaching the courses.

In addition to in-house training (or in lieu of it, if the organization is smaller) are the audiovisual training courses. These courses have the advantage of allowing an individual to be provided with training as it becomes available. Courses range from one day to one week.

When individual training profiles are developed, this type of course becomes highly desirable because the individual can fit the training into his project work schedule and not have to wait until group courses are scheduled.

Supplementing the previous two methods are the open seminars and institutes which are advertised in trade journals and other media. Often these courses, given by important people in the field, are motivational and extremely helpful in raising the professional level of the people on the staff.

The basic payoff from training is that it is usually far cheaper to enhance the skill level of someone who is already a dependable employee than to go outside to try to hire already trained individuals. This process also offers the ability to build a solid staff trained in the specific skills the management of your organization considers to be most important.

Postinstallation Audit

Upon the completion of the systems development project, it is considered desirable by most organizations to conduct a postinstallation audit to confirm the results of the project work. At a later time, a second audit will measure whether the system is providing the benefits promised when the funds were allocated as well as whether the system is performing as anticipated.

The use of audits in DP will parallel how an organization checks on expenditures in other areas. If audits are part of the management style, then conducting them for systems projects will be a worthwhile event. If audits are not

(Continued on In Depth/22)

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(Continued from In Depth/21)

considered important, it is doubtful that the effort put into one will yield many benefits.

The ability to conduct a meaningful postinstallation audit is dominated by the care in which the benefits and objectives of the project were documented at the beginning of the project life cycle. Many organizations prepare a document called a project proposal at the beginning of the life cycle which describes the tangible and intangible benefits anticipated if the system is created and also provides an overview of the system's objectives and operation.

The benefit section of this document becomes one of the primary inputs to the postinstallation audit process. Oversimplified, the objective of the audit is to measure whether the things that were promised actually came to pass.

Immediately upon completion of the project, the audit attempts to determine whether parallel operation (or other methods used to initate the system) produced acceptable results and to document the complete cost and schedule performance of the project work. Any deficiencies in the parallel operation or budget adjustments that are necessary are handled at this time.

Approximately six months after the end of the project, the audit is performed to measure whether the benefits actually resulted and whether the users are operating the system in the manner in which it was designed. The audit starts with the gathering of data on the costs and benefits of operating the system, and information is gathered by observation and interview on the manner in which the system is used.

The evaluation period in the audit condenses the data that has been gathered and compares the actual benefits and system operation with the objectives and anticipated benefits documented in the project proposal and in other portions of the project life cycle. The result of this process usually is captured in a report displaying the results of the audit.

It is important that the audit be received by a management level high enough to initiate corrective action if necessary. In many instances, the audit report will stimulate the preparation of a work request for a follow-on project to remove deficiencies that were uncovered.

If the management of the organization sets the priorities at a high level for executing this follow-on project, then it can be expected that the system operation will be promptly corrected.

Written audit guidelines are very helpful to the person who conducts audits only from time to time.

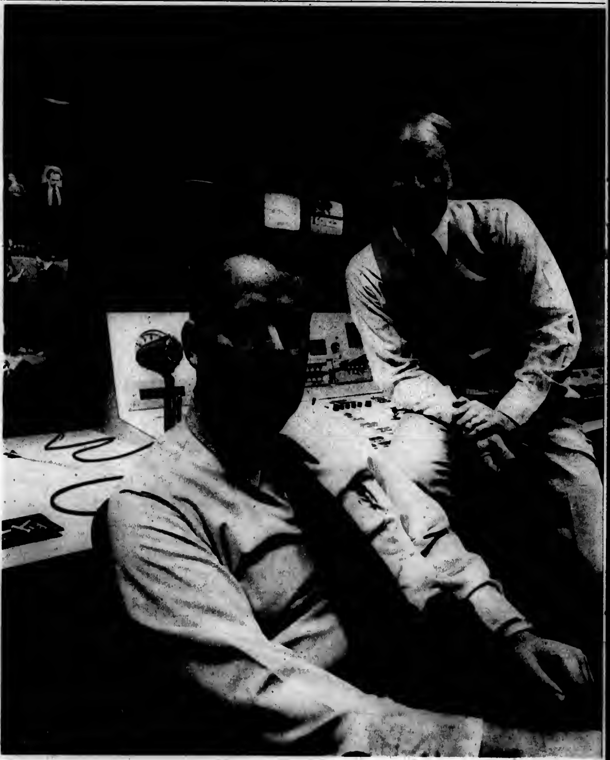
Project Management Methodology

Good project management needs a special environment and the right materials so the implementation of its methodology will be accompanied by organizational changes. If an organization has not yet split its analyst/programmer group into two sections so one group concentrates on larger development work and the other on small projects and maintenance, then I urge each organization to do so. The separation of the staff also facilitates a very logical structure for management priority-setting.

This priority-setting structure creates two levels of review committees. The upper level, composed of more senior user management, considers work requests greater than a certain level, such as $20,000, and normally meets quarterly to rank these requests, which is a very workable way of setting priorities. This list creates an unambiguous direction on which projects to start next. Procedures and training are needed for this process.

For all requests costing less than $20,000, a second committee normally meets monthly to put them into rank sequence. It is recommended that anything smaller than one man-day and true emergencies bypass this priority-setting scheme. The resulting list gives positive direction to the persons specializing in this class of work. This process also needs procedure.

How operations and maintainance documentation is to be stored becomes an important issue in implementing a methodology. The turnover of documentation is most efficiently done if it is batched by the development team in identically the same arrangement as it will ultimately be stored in the computer operations or maintenance areas.



If the organization has not yet decided how to finalize the storage, then it is important that it do so. Existing documentation may have to be repackaged.

Having all work arrive on a written work request form is an essential ingredient to the project management process. Once the work request comes in, then a screening function makes sure the request is understood and judges the size of the job. This is followed by the appropriate approval, depending on the size of the requested work. All of this activity needs to be proceduralized.

Putting in place a set of estimating guidelines is also of prime importance, as is training the staff to use the chosen estimating techniques. Once the estimating process has been installed, an organization is better prepared to accomplish the primary goals of any project management system, which are to bring the project in on schedule and within budget.

Installing the time and progress reporting system is obviously a key element. Many larger organizations choose to purchase a piece of software capable of collecting times and producing reports that compare the actuals to the plan times coming out of the estimating process. If an organization is not large enough to utilize software, then a manual reporting system must be created and implemented.

Progress reporting on the status of projects needs to be initiated so that DP and user management is periodically informed of where things stand. The management that is denied information tends to believe rumors.

The information that gives this status reporting visibility is the estimated hours, the scheduled dates and the actual hours and completion dates. Narrative reports are also needed because numbers alone do not tell what is happening.

Starting Point

Because of the far-reaching impact of methodology, the ideal starting point for introducing it is to secure top management commitment to a series of items:

- Agreement that the data processing procedures can be used to implement the process.
- Agreement that management will participate in setting priorities on the backlog and monitor active projects.
- Agreement that management will issue policies to ensure user participation in projects, to prohibit bypassing of the priority-setting processes and to give the needed authority to the quality reviewers.

Another key beginning task is to prepare a detailed plan for implementation that spells out each item to be performed, who has the responsibility for it and the date on which the results of the task are due. The DP management team should be prepared to monitor the actual progress according to that plan.

If the implementation is split up into a series of clusters of functional tasks, then a review of each cluster can be meaningful.

It is important that the planner of project work be able to instruct the project team on what he had in mind when he chose particular items and assigned particular man-hours. Performance standards, which are normally created to assist the intermediate and junior personnel in the department in the execution of the various tasks, can provide this guidance. The task of creating (or customizing) the standards (man-months) if a project management methodology package is to be purchased (man-days) is a serious activity and needs to be done in a professional and expeditious manner.

Once the proper materials, appropriately customized, have been put in place, then the time has arrived for training the staff to execute the project management methodology. The project manager is the recipient of the majority of this training because of the key leadership role he plays, providing direction to the project team on the things to do while the project is passing through its life cycle. One to two weeks of directed training is needed for the project managers.

A byproduct activity that takes place in the training is the "selling" of the methodology to the members and staff. A senior instructor conducting classes for a number of days tends to add validation to the methodology.

A logical introduction to the method-

(Continued on In Depth/26)

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Mike Jones
Assistant Vice President and General Manager
Jefferson Data Systems

The Sycor 400 family. All the power JDS needs to help major broadcasters get their programming together.

In 1969, Jefferson Pilot Broadcasting Corporation made a major decision.

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The venture was so successful it quickly blossomed into a subsidiary, Jefferson Data Systems. Today, JDS provides distributive software programs to over 60 of America's largest radio and TV stations, as well as their own broadcast properties in North Carolina, Virginia, Georgia and Colorado.

Sycor has always played a key role at JDS. Initially, Sycor 340 and 350 systems formed the nucleus of each station's remote capability. As service demand grew, Sycor 440 systems were deployed. Now, Sycor's most powerful equipment, the new 445 with multifunctional operating software, has been successfully tested and is scheduled to be installed.

"We wanted to provide our clients with equipment that performed without making computer people out of them."

"It's a fill-in-the-blank type of system, which is very easy to handle," according to Bill Jennings, JDS general sales manager. Compact Sycor 440 systems are placed within the stations. Each is used for entry and retrieval of data pertaining to every aspect of the stations' operations, as well as for providing each station with its own data processing capability.

Information is then telecommunicated directly to Jefferson Data's central computer, where it is processed and stored. Processed information is periodically returned to each of the 440 systems over undedicated telephone lines, for generation of program scheduling, contracting, invoicing, and general accounting reports. In fact, the JDS System 80™ package produces over 100 reports for subscribers.

"People have been freed to perform additional tasks."

"Before Jefferson Broadcasting obtained the Sycor systems, at least three or four people per station were required for writing up contracts, and editing the log while moving commercials around. The Sycor systems have automated this entire process. In addition, they have allowed us to tighten operations. Before, six to ten percent of our annual billing was 'falling through the cracks.' And with 30-second commercials costing as much as $20,000, losing one was a very expensive proposition. Now, once data is entered into the system it is never lost.

One of the Sycor systems that helps Jefferson Data Systems' subscribers save time and organize work.

"We went to Sycor after evaluating several manufacturers. We feel they have one of the finest technical and service organizations in the world."

"We've never had anybody miss a processing day or lose a log," boasts Jennings. All JDS accounts have a toll-free number and access to Sycor's National Dispatch Service in Ann Arbor, Michigan. There, 20 operators and 13 Sycor terminals are available 24 hours a day to handle service calls. As calls are received, information is relayed to one of more than 110 service locations. "In all of the applications we're now performing, the Sycor equipment is fantastic," adds JDS Systems Engineer John Reidy.

Call Sycor toll-free at 800-521-2838.

For more information on how you can get a Sycor system performing for you, call Tony Fazio, VP Sales. Or write us at Sycor, Inc., Box D, Ann Arbor, MI 48106.

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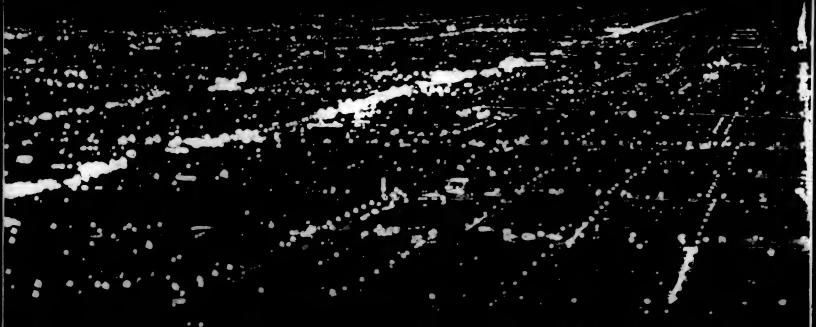

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(Continued from In Depth/23)

ology is to use it initally on a few pilot projects. Even though the methodology was created internally and sounds completely logical to the architect of the system, in actual use differences do crop up.

It is wise to understand them before attempting to impose the process on all members of the staff; once staff resistance is encountered, it is difficult to make it go away.

It is strongly recommended that a separate administrative person — a project control administrator — be appointed to watch over the methodology and to keep its contents up-to-date.

The introduction of a methodology introduces a bit more structure into the department's operation, and accompanying this structure are administrative activities, questions and challenges and new policy issues. Unless these activities are taken care of properly, the implementation of the methodology can get in trouble.

The presence of a separate administrative person can be quite critical. It is important that this individual be given adequate training to permit him to appropriately execute his responsibilities.

Special Effort Needed

Setting up the administrative process takes a special effort. This includes such jobs as initiating a work request for all jobs currently in the shop, preparing backlog schedules, getting time sheets introduced and setting up status records. Each of these items takes time, and it is important that the setup be complete.

Starting the management priority-setting requires great skill and careful preparation. The composition of the priority-setting boards needs to be set, an orientation meeting, a practice session and a "live" session usually gets the process operational so the management group feels comfortable in its role.

It is important that this process be translated into management terms so the lack of familiarity with DP will not restrict the executives from active participation.

Objectives to Reach

A methodology can be considered to be firmly in place when the following objectives have been reached:

- The management group meets periodically to set priorities on proposed projects and feels comfortable in its role.
- The staff is trained and has in its possession the needed standards and procedures.
- Documentation is turned over in a completed status and kept up to date.
- Accurate status reports are produced on a timely basis for each project.

John D. Toellner is president of Spectrum International, Inc., formerly known as J. Toellner & Associates, the developer and marketer of the Spectrum project development system.

Toellner has 27 years of industrial experience; the last 15 years have been spent in DP-related consulting.

The author holds a B.S. in mechanical engineering from the University of California at Berkeley and did two years of graduate study in operations research and computers.

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DALLAS INTEL COM 79

Entry-Level System Built On Disks by Basic Four

SANTA ANA, Calif. — Designed for companies making the transition from manual accounting methods to computers, Basic Four Corp.'s newly introduced System 410 is a multiterminal, programmable business computer that offers users low-cost disk storage and increased system memory, according to the firm.

The system's base configuration consists of 40K bytes of system memory, a 14M-byte disk storage system, CRT terminal and a bidirectional printer. In addition to on-line storage, the system utilizes a magnetic tape cartridge drive with a removable 9.2M bytes of storage for backup and off-line storage, a spokesman noted.

The system's maximum configuration includes 96K bytes of system memory, 42M-byte disk storage system, 9.2M-byte tape cartridge, eight CRT terminals, two serial printers and two line printers. The system reportedly supports 150-, 300- and 600 line/min printers.

The System 410 will compete with a myriad of products now on the market, according to the spokesman, including the IBM System/34, Burroughs Corp. B80 and B800, NCR Corp. 8230 and 8250 and Wang Laboratories, Inc.'s. WCS-30. Also in competition will be Qantel's Model 950, Microdata Corp.'s Vantage, the Data General Corp. CS/40 and the Digital Equipment Corp. 320 and 350.

Winchester-Type Disk

Ease of installation and operation are the major attractions of the system for a first-time computer user, the spokesman claimed. The system's fixed, Winchester-type disk allows upgrading at a cost lower than competitors can offer while keeping data on-line, he asserted.

In addition, the system's 9.2M-byte magnetic tape cartridge offers twice the storage capacity of a disk cartridge at a quarter of the cost, according to the spokesman.

The System 410's CPU is a microprogrammed computer designed and manufactured by Basic Four. The Basic Operating Software System (Boss) utilizes 32K bytes of protected operating system memory and 8K bytes of user memory, the spokesman said.

Boss consists of a disk-oriented, real-time executive and an interpreter for executing the business Basic language.

The System 410 utilizes a 14M-byte fixed-disk drive enclosed in the CPU console. The drive can be upgraded to 28M or 42M bytes.

An associated controller contains a microprogrammed processor that performs selected error checking and correcting routines, as well as controlling data transfers between the CPU and the disk drive, the spokesman said.

Equipped with a standard typewriter keyboard and 10-key numeric station, each of the System 410 CRT terminals has a capacity of 24 lines of 80 char., the spokesman said. A total of 1,920 char. can be displayed at one time.

(Continued on Page 54)

The Basic Four Corp. System 410 incorporates a disk storage system, CRT terminal and bidirectional printer.

Prices Cut

TORRANCE, Calif. — Randal Data Systems, Inc. has reduced the prices of most of its small business systems and at the same time upgraded its standard 960-char. CRT console to 1,920 char. while cutting its price.

Price reductions of $1,000 per system apply to most of the Randal 240, 540 and 550 system configurations, according to a spokesman. Their base prices, which include a desk, a CRT with numeric pad (three CRTs in the case of the 500) and a printer are now $23,900, $44,800 and $51,800, respectively.

The 1,920-char. console now costs $1,900, $800 less than its former list price of $2,700. The latest price is $500 below the cost of the 960-char. console, which sold for $2,400.

Randal is located at 365 Maple Ave., Torrance, Calif. 90503.

Dual-Processor Model of Syfa Offers Complete Redundancy

IRVINE, Calif. — A dual-processor version of Computer Automation, Inc.'s Syfa network processing system that was designed to provide complete processor redundancy has been announced by the firm's Commercial Systems Division.

The Syfa Cloned-Processor System (Syclone) includes a primary processor, a backup redundant processor and a switching station. The redundant processor is an exact duplicate, or "clone," of the primary processor, according to a spokesman, and the switching station transfers control of peripheral units from the primary processor to the redundant processor in the case of processor failure.

The Syclone system allows the user to configure a backup system without purchasing two sets of peripheral units, the spokesman said. One field-test user claimed the backup system was more economical than maintaining a large field service staff, he added.

CA's Syfa competes with Digital Equipment Corp. PDP-11/30 through PDP-11/70, the Hewlett-Packard Co. 3000 series and cluster terminals from IBM as well as its 8100 series and System/38, the spokesman said, adding that he didn't know if those companies offer redundant processors.

The Syclone system was built for "critical applications" in business environments. "If a problem should occur in the primary processor, the system operator unlocks a master key switch on the switching station and presses the appropriate button," the spokes-

(Continued on Page 54)

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Mini Totaling Bills for Cabs' Charge Customers

By Marguerite Zientara
CW Staff

NEW YORK — Hailing a cab in the rain in New York City isn't always possible — unless one is a credit customer of the United Taxi Owners Guild (Utog), which is using a minicomputer to tote up the monthly bills for those customers.

Since it acquired the mini, Utog has cut from about two weeks to a few days the amount of time it takes to handle end-of-month accounting functions.

Utog claims 200 cab driver members and thousands of credit customers from such institutions as banks, publishers, financial firms, law offices, accounting firms and the phone company. Utog charge customers rarely have a problem getting a taxi in the rain since they call ahead and have first preference over people in the street, according to Bernard Hager, a taxi owner and driver and Utog's president.

Individuals whose employers have charge accounts with Utog have only to give their account numbers to the driver when they enter a cab. The driver turns in a "chit," or voucher, for each credit fare at the end of the day.

With the thousands of charge customers generating vouchers, paperwork became overwhelming for Utog. "Last year, we billed over a half million dollars and this year we expect billing to exceed $1 million," Hager said. "That's why we needed a computer."

Keyboard Operation

Hager was sold on IBM's 5110 minicomputer on first try and purchased the unit in May. "The computer is small and inexpensive enough to make it practical for a group as small as we are," Hager said.

Month-end closing, formerly done manually, is now a matter of keyboard operation with the 5110, according to Leon Koltun, Utog's head bookkeeper. "We take the chits and key them into the 5110," he explained. "The computer matches up customer numbers with data in our disk files and prepares bills for mailing.

"At the same time, it accumulates the drivers' pay, including tips, and produces a check for each driver for all charge accounts he has driven in the past month," he continued.

Before the computer was installed, it took a week to process pay checks, according to Hager, while now it takes two or three days.

Ease of use was an absolute requirement for the computer system. "We are a cab company before anything else, and several people can run this system interchangeably," Koltun stated.

The system, which uses one program with a number of accounting functions within it, was usable right after a few application modifications, Koltun said.

Utog's 5110 has 32K of memory, a 120 line/min printer and five diskettes, each with 1M-bit capacities.

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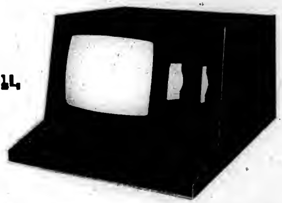

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Syclone Offers Redundancy

(Continued from Page 53)

man explained. "This brings the redundant processor on-line, and all peripheral devices are placed under its control."

The on-line data processing applications can then continue while a CA field service representative is dispatched to correct the problem. Once the primary processor has been repaired, the switching station is again activated, and control is returned to the primary processor.

In addition to the dual processors and the switching station, the Syclone system can be equipped with up to eight disk drives, 32 CRT terminals, four spooled line printers, 32 character printers and two concurrent synchronous communications channels.

The eight disk drives can accommodate any mixture of 32M-, 80M- or 300M-byte drives for maximum online storage of 2.4G bytes, according to the firm.

The redundant processor must be configured with any special features such as expanded memory or other options that are present in the primary processor, according to CA. This ensures that the redundant processor remains a "clone" of the primary processor.

The basic Syclone system includes 64K bytes of memory in each processor, optionally expandable to 304K bytes.

The Syclone system represents a further step in the company's recently introduced Virtual Network concept, the spokesman said. One of the Virtual Network's key features is that any component failure will not affect other systems or terminals in the network.

In addition, each Syfa in the Virtual Network has two concurrent synchronous communications links which prevent it from becoming an "isolated node" if one of the links is lost, the spokesman said.

Virtual Storage

The Syclone system operates under the standard version of the Syfa Concurrent Logic Operating System (Syclops). This virtual storage operating system supports the concurrent execution of 32 interactive foreground applications programs, 16 batch background jobs, four printer spooling jobs and two synchronous communications tasks, the spokesman said.

The dual processors are housed in the desk-type enclosure with the disk drives while the switching station is free standing.

The primary processor sells for $29,000. Disk drives and other peripheral units are offered at standard Syfa list prices. The redundant processor and the switching station together cost $32,500 for a system with one disk drive.

For each additional disk drive configured on the system, the price of the redundant package increases by $3,000, the CA spokesman said from 2181 Dupont Drive, Irvine, Calif. 92713.

Basic Four Adds Novices' System

(Continued from Page 53)

Data is transmitted over full-duplex asynchronous communications lines at a maximum rate of 9,600 bit/sec, according to the spokesman.

For a distributed processing environment, the System 410 is available with Basic Four's Forms Entry System as well as a synchronous communications capability.

The standard bidirectional printer can produce forms and reports and plot graphs, the spokesman noted. The basic printer for the system operates at 120 char./sec, but the system can support two 600 line/min printers.

Ten Serial Ports

Also optional is a terminal controller that enables the user to expand the system with up to 10 serial ports. Peripheral equipment such as remote printers and up to eight CRT terminals can be connected to the added ports.

Applications software that is available for other Basic Four systems can be utilized on the System 410, the spokesman said.

The System 410 represents an extension of the hardware philosophy of Basic Four's System 200, which was introduced last January, according to the spokesman. Both systems used a fixed disk with tape cartridge backup as opposed to Basic Four's usual Trident removable disk, he explained.

The minimum configuration carries a $32,500 price tag. Basic Four can be reached at P.O. Box C-11921, Santa Ana, Calif. 92711.

More Capacity Needed

Change in Vendor Loyalty Increases Efficiency

ZION, Ill. — After seven years of upgrading from one IBM system to another, a wholesale distributor here switched to Wang Laboratories, Inc. equipment in a move that resulted in more efficient operations and greater system expandability, according to the firm's DP manager.

Mid-Way Supply, Inc., a distributor of refrigeration and heating supply parts, has long used computer technology to maintain the basic tenet of its operation — speedy customer service. Founded 26 years ago, the company first used computers in 1964 through a service bureau. In 1971, an IBM System/3 Model 6 was brought in-house.

Later expansion resulted in a move to a System/3 Model 8, but eventually an increase in work volume, inventory and a desire for new applications created a need for more capacity.

Solution Not Optimum

The logical response to the situation was yet another upgrade, according to Kay Sisson, DP manager for the firm. In mid-1977, Mid-Way ordered an IBM System/34 to meet its expanding needs.

"That really wasn't an optimum solution," Sisson said, "because at that time the disk space offered on the System/34 was only 2M bytes short of being filled with our current information."

Sisson, daughter of the company's founder, also acts as treasurer, office manager and personnel manager for the company. "With all my other responsibilities, I really couldn't afford the time required to go through the time-consuming task of converting from one IBM system to another again and again," she noted.

After receiving literature in the mail describing a virtual storage computer being released by Wang Labs, Sisson visited Wang's Chicago office for a hands-on demonstration.

Mid-Way had about 200 programs to convert, most of which were written in RPG-II. The firm also wanted to do some programming in Basic in relation to its purchasing functions.

Since the Wang demonstration indicated both RPG and Basic could access the same files, Sisson decided to pursue the matter further and took a tour of a large merchandising user's installation. The visit made up Sisson's mind. In February the sale was made; the Wang VS system arrived in May and was operational a day and a half later, with conversion taking place in July.

Mid-Way's system is comprised of a Wang VS system with three workstations and a system console, a 128K-byte memory, a 200 line/min 2261-V printer, 75M-byte disk drive and a 9-track tape drive.

Speedy Conversion

In order to facilitate a speedy conversion, Sisson said, most programs were converted from the IBM system batch processing to batch processing on the Wang system. To better utilize the Wang unit's on-line storage and retrieval system and to allow Mid-Way to accelerate inventory records, an on-line order entry system is being developed on the VS system for use in the near future.

A total of 300 to 400 orders per day are processed from Mid-Way's four locations. "Utilizing the current batch invoicing system, each day we update a month-to-date quantity sold, keeping track of dollars in sales and dollars in cost for each product at each location," Sisson said.

Once a month that information is incorporated into a history record containing the last 18 months' data as well as three years of totals. In this way the purchasing agent can logically determine what to order.

"With 8,000 or so line items coupled with about 1,200 suppliers and almost a million dollars tied up in inventory, the history reports are very important to us," Sisson noted.

"They depict at a glance what products have been sold at what locations and during what months, so we have a trend analysis by product number and location."

Accounts payable procedures include invoice transactions, check printing, maintenance of a check register and a number of reporting tools to keep up with the daily rate of 15 purchase orders, some containing up to 400 line items.

The conversion of IBM programs to the Wang VS was an easy task, according to Sisson. "I made modifications and compiled almost 100 programs in four hours one day on the Wang system," she noted. "Programs were being changed and compiled in less than three minutes."

Modifying programming instructions was also a minimal effort because of the VS IBM compatibility and its text editor: "I didn't have a great deal more difficulty on program code conversion between the System/3 and the VS system than I had in going from the IBM System/3 Model 6 to Model 8.

"Leaving IBM was not an easy thing for us, but I don't regret our decision," she added. "I love the fact that we can grow with the Wang VS system without making any conversions."

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Switch to Interactive Processing

System Helps Firm Direct Thriving Inventory

SAN ANTONIO, Texas — Moving from a batch processing system to an interactive one has given an equipment and parts distributor here not only better customer service capability but also accurate inventory status reporting.

Catto & Putty, Inc., founded in 1939, sells air-cooled engines manufactured by Briggs & Stratton, Tecumseh and Kohler as well as lawnmowers manufactured by Murray, Snapper and MTD Products, Inc. It also sells all parts and accessories for these product lines.

Its volume requires more than 12,000 inventory categories which contain many thousands of individual items, according to Bill Putty, the firm's president.

"In the early 1960s, the enormous volume of paperwork generated by our high turnover of inventory was becoming too much to handle," Putty explained.

"We first tried our hand at DP in 1962 with an IBM 402, then in 1966, we went to an IBM 407 and in 1969, to an IBM System/3," Putty noted, adding that each change taught his firm more about DP and what it could do for business.

Catto & Putty's computing, however, was in batch mode, involved two employees as full-time keypunch operators and just wasn't fulfilling the requirements of the company. "It was too slow and our inventory records were never up-to-date," Putty said.

"We have always tried to operate our business on a 'real-time' basis, serving our customers as expeditiously as possible," he noted. The wait for computer time motivated his interest in dispersed processing.

Demonstration Arranged

In the spring of 1975, Putty arranged for a demonstration of some Datapoint Corp. equipment. "We put Datapoint 3600 CRT workstations exactly where we needed them — in customer service, warehousing, receiving and invoicing.

"After a few days, I didn't need to have 'functionally dispersed DP' explained to me," he noted. "I could put computer power where it was needed." Following further demonstrations, the firm leased the equipment it needed in the summer of 1975. Catto & Putty has since mastered transaction processing by bringing computing capability to all sectors of the company, according to the firm's president.

Out of 15 in-house employees, nine use the Datapoint Datashare system on a part-time basis for processing their paperwork transactions, and six others work with the system on a full-time basis. These personnel are involved in all aspects of the business, and manually generated paperwork is practically nonexistent, Putty said. New employees are trained on the system as part of their orientation so they understand everything as a package. As a rule, they are on-line within a month.

Benefits of System

"Now all of us have full access to all our business information all the time," Putty remarked. "We are able to input error-free data because the system checks for accuracy as the data is entered from source documents.

"This reduces massaging of information, virtually eliminates errors, lowers cost and, as a result, we receive timely information we can believe in, both on CRT screens and hard-copy printouts," Putty said.

Catto & Putty's Datashare business time-sharing system consists of eight Datapoint 3600 CRT workstations that transmit and receive data interactively to and from a Datapoint 5500 business computer.

The 5500, with 48K bytes of user memory, utilizes two mass storage disk units with a total of 50M bytes. The system includes one Datapoint 60 line/min terminal printer and one Datapoint 300 line/min printer.

Perpetual Inventory

As soon as a shipment is received at Catto & Putty, it is entered into the inventory system through a 3600 workstation in the receiving department. The system tracks quantities of inventory items on hand and monitors back-order levels.

A "picking slip" is automatically produced from the customer back-order file on an "oldest order, first out" basis, Putty explained. Those items are "picked" before the order is stocked, assuring back-order priority and ensuring that these units are not entered as active inventory.

Reorder points are established for each item and when they are reached, the system indicates this on a suggested order printout. In addition, the history of each item's usage — its dated turnover — is noted by the program so purchases can be made to coincide with periods of peak demand.

Fast Information

Fast information for customer service is one of the main benefits of the system. According to Jessie Guerra, the man behind the customer service counter, "When I key in the inventory status report, I receive the item description, stock number, manufacturer, pricing structure, numbers on hand, on order and on back order as well as item warehouse location by aisle and bin number."

Besides its own business computing, Catto & Putty also provides computer services for six organizations ranging from a jazz band to a church. To meet all these needs, the system uses a large number of programs.

These include 16 accounts receivable programs serving 700 accounts, 12 payroll files using 20 programs that issue checks to more than 100 people twice a month, in addition to 75 inventory programs.

The company's DP library also includes 25 general DP programs, 21 receiving and accounts payable programs and 34 sales analysis programs, according to Putty.

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HP 2631 Line Gains Graphics Unit

PALO ALTO, Calif. — A graphics model has been added to the recently introduced Hewlett-Packard Co. dot-matrix, serial impact 2631 series of printers. The printer produces hard copy on standard paper from any raster-format display on an HP 2647 or 2648 CRT graphics terminal, according to the firm.

The HP 2631G, with resolution of 72 by 72 dot/in., is also an alphanumeric printer that accepts Ascii data and prints at 180 char./sec, like all members of the HP 2631 family, a company spokesman said.

Graphics print speed is increased with a double buffering technique, by which the 2631G can accept graphics data while simultaneously printing, the spokesman claimed. Graphics throughput is further enhanced by using the microprocessor to delete trailing blank portions of the display.

Using this technique, a typical graph of 10 in. by 5 in. from the screen of a CRT terminal can be printed in less than 60 seconds. The hard copy is nonfading and multiple-part paper may be used, according to HP.

The HP 2631G shares the alphanumeric capabilities of the HP 2631A, upon which it is based. Its microprocessor computes the shortest printing path, deletes all leading and trailing blanks, and skips over 10 or more imbedded blanks, the spokesman explained. Horizontal tabs are similarly speeded, he noted.

Forms of up to six parts with carbon interleaved may be printed with widths up to 15.75 in. and of any length up to 255 lines. Page length (physical page size) and text length (printed page size) can be independently set via program control, the spokesman said.

Four print sizes are program selectable — 5 char./in. and 7.2 char./in. for titles and headings and 10 char./in. for normal typewriter-size text, the spokesman said. Compressed printing at 14.4 char./in. allows 196 columns on standard computer paper.

Line spacing is also program-selectable at one, two, three, four, six, eight and 12 line/in. for superscripts, subscripts and single or double spacings in six or eight line/in. The standard unit comes with the full 128 Ascii character set, including upper and lower case characters as well as all control codes, according to the firm. Using display function mode, control codes are printed for debugging of formatted data output.

Several optional foreign languages are available including the European languages, math symbols (Greek), Cyrillic and Katakana, the spokesman said. Several of these languages may be resident in the 2631G and are selectable via program control. A high-density language is also available which operates at 90 char./sec for applications requiring letter-quality print, according to the company.

The printer is said to be adaptable for business, science and engineering applications.

The HP 2631G costs $4,250 with quantity discounts available. The unit comes with an HP-IB (IEEE 488-1975) interface and operates with HP's 2647A and 2648A graphics CRTs.

Delivery is about 12 weeks from 1507 Page Mill Road, Palo Alto, Calif. 94304.

RAMs Reduced By Monolithic

ENGLEWOOD, Colo. — Monolithic Systems Corp. has reduced the prices of its 64K- and 32K-byte random access memory (RAM), Multibus-compatible memory systems.

The MSC 4602 with 64K of RAM is now priced at $1,925, reduced from $2,175. The 32K version costs $1,190, down from $1,275.

Both versions of the memory system offer up to 16K of on-board erasable programmable read-only memory (Eprom) at additional cost.

Prices are for single quantities; OEM discounts are available. Monolithic is at 14 Inverness Drive East, Englewood, Colo. 80112.

LSI-11 Users Get System Analyzer

PORTLAND, Ore. — A hardware and software instrumentation package for the Digital Equipment Corp. LSI-11 family of microcomputers that was designed for debugging, system resource usage measurement, software optimization and computer education is available from Nortek, Inc.

The system reportedly helps answer such questions as "What sequence of events preceded the processor halt?" "What is the ratio of I/O and processing activity?" and "How long does this software routine take to execute?"

Monitoring memory access and utilization is possible through an X-Y coordinate mapping technique, resulting in a real-time display on the user's oscilloscope. Software-controlled "windowing" refines the display by a factor of 8, a spokesman claimed.

Address, data and interrupt vector information may be collected by means of an interface compatible with most logic analyzers, according to the firm. Card edge connectors terminate all major signals and LEDs visually monitor principal control signals, he noted.

The module is priced at $500, which includes cables and connectors, a user manual and an extended version of the ODT software debugging program. Nortek is at 2432 N.W. Johnson St., Portland, Ore. 97210.

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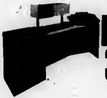

NCSS 3200

For Novas, Eclipses

Controller Allows Disk Mixing

SUNNYVALE, Calif. — Data General Corp. Eclipses and Novas can reportedly accommodate up to four storage module-, Winchester- and IBM 3330- type disk units with a disk controller from Ball Computer Products, Inc.

Capable of supporting up to 1.2G bytes, the Model 3255 controller occupies one CPU chassis slot and accepts disk units whose data transfer rates range from 806 byte/sec to 1.2M byte/sec., according to a Ball spokesman.

Mass storage modules supported by the 15 sq-in. board include the Ampex Corp. 940, 980, 9100, 9200 and 9300; Ball BD 50 and BD 80; Control Data Corp. 9730, 9760, 9762, 9764 and 9766; and Memorex Corp. 601 and 677.

The controller can intermix any of these products regardless of capacity, transfer rate or organization, the spokesman added.

Ball also credited the Model 3255 with combining control functions usually requiring multiple disk controllers. Some of these functions reportedly include error correction. capability, multiple-record length format, bad-track flagging, alternate track sparing, automatic diagnostics, overlapped multiple seeks, multirecord transfers and a 2K-byte, first-in/first-out buffer.

Using proprietary technology, the controller can correct errors in bursts as long as 11 bits and detect burst errors as long as 25 bits, the spokesman said.

For systems with support facilities, the controller incorporates the logic for automatic drive power sequencing, logical unit file addressing and dual-channel accessing from two independent or dissimilar CPUs, the spokesman said.

The Model 3255 costs $3,500 and is available from Ball at 860 E. Arques Ave., Sunnyvale, Calif. 94086.

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Okidata Printers Gain Capability For Graphics

MOUNT LAUREL, N.J. — In addition to printing conventional text, two members of the Okidata Corp. Slimline Series of line printers can reportedly output drawings, graphs, bar codes, charts, logos and half-tones now that the company has equipped the printers with a graphics capability.

Okidata added the graphics option only to the 125- and 250 line/min members of the Slimline series, which also includes 160- and 300 line/min models.

With the graphics capability, the two Slimline members can reproduce any image that a CRT terminal can display, according to an Okidata spokesman.

Available with Centronics Data Computer Corp. and Dataproducts Corp. interfaces, the graphics-equipped printers horizontally output 60 dot/in., equivalent to 792 dots across a 13.2-in. line, the spokesman said. They vertically output 72 dot/in.

Without the graphics option, the 125- and 250 line/min printers costs $1,895 and $2,495, respectively. With the graphics option, the two units cost an extra $95 and $150, respectively.

Okidata is located at 111 Gaither Drive, Mount Laurel, N.J. 08054,

Smart Disk Controller Built for Intel Micros

CINCINNATI — An intelligent controller that interfaces a number of rotating storage devices has been announced by Computer Systems Development, Inc. (CSD).

Based on the Intel 8085 microprocessor, the CTR-80/86 allows connection to Intel MPUs through the Intel Multibus, a CSD spokesman said.

The device can control up to eight fixed, floppy and/or cartridge disk drives and is physically and electronically compatible with Intel's SBC series of computers and interfaces, according to the spokesman.

The unit offers control of Winchester-type fixed disk or cartridge disk units and floppy disk units including single- or double-sided and single- or double-density devices. It also features FM or MFM encodability and media compatibility with IBM 3740 or Series/1 equipment, CSD claimed.

The CTR-80/86 is priced at $1,995. CSD is at 4154 Crossgate Drive, Cincinnati, Ohio 45236.

Prime Improves Drives, Maintains Original Prices

WELLESLEY HILLS, Mass. — Prime Computer, Inc. has enhanced a number of its storage module disk drives while maintaining previous prices and reducing previous maintenance costs, according to the firm.

These improved disk drives offer several features not found on earlier 40M-, 80M- and 300M-byte disk drives, including a pack access cover interlock, write protect switch and a dual-port option.

The pack access cover interlock switch prevents the disk drive lid from opening when the pack is spinning. The write protect switch, when depressed, inhibits writing on the disk pack, enabling the drive to be used in a "read only" capacity, the spokesman explained.

The optional dual-port hardware feature requires no software support, the spokesman said. It allows two systems to be physically cabled into one storage module device and have only one system actively accessng the disk.

The devices are compatible with the storage modules they replace, according to the firm.

Available immediately, a 300M-byte disk subsystem including controller, disk pack and cable costs $42,000, with an annual maintenance price of $300. An 80M-byte disk drive subsystem with controller, cable and disk pack costs $27,000 with an annual maintenance price of $200.

A 40M-byte disk subsystem with controller, disk pack and cable lists for $23,500 with an annual $200 maintenance fee. Prime is at 40 Walnut St., Wellesley Hills, Mass. 02181.

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Store Owner Cites Snags

Micros Seen Not Yet Ready for Business

By Tim Scannell
CW Staff

WALTHAM, Mass. — Data processing aficionados will probably remember 1978 as the year of more powerful processors and unbundled software, suitcase-sized minicomputers and 64K-bit chips. But few will commemorate this year as a time when microcomputers were finally accepted as legitimate small business systems, according to the president of a computer store here.

"Microcomputers have not truly entered the business field yet," Charles Dunning of Computer Mart, Inc. stated. Problems in hardware and software development as well as exorbitant prices are among the factors preventing "the true under-$10,000 micro business system" from happening this year.

Microcomputer software takes up the biggest chunk of a small business system's price becuse of the time and effort it takes to fully develop the package, which makes it "very, very tough" for the software producer, Dunning noted. "There are relatively few software producers in the microcomputer field who are selling programs in high enough volume to really amortize their development costs."

Buyers expect software costs to be a fixed percentage of the micro's hardware price, when actually it costs more to produce good business software on a microcomputer than on a big machine, Dunning added.

Support Problems

Reliable support, or the lack of it, is also a basic concern of the businessman considering a microcomputer-based inventory or payroll system. Dealers not only have to support hobbyists who may treat the computer like a "hi-fi" system or electronic game, but must also back up the businessman whose company may fall apart if the system is down too long, Dunning explained.

"Hardware and software have to be kept running and that's a lot more risk for us so the [total] price is going to have to be higher to take that into account," he said.

Small business-oriented microcomputer packages in the $3,000 to $4,000 range, such as Radio Shack's TRS-80, are a "farce," Dunning said. "Anyone who is serious about doing all five or six business functions on a computer, who wants maintenance and who wants the system running all the time will pay at least $15,000 for his system, if he's lucky."

The TRS-80 could be a business system "with about $1,000 to $3,000 worth of additional hardware and perhaps somewhere between $1,000 and $3,000 worth of additional software," Dunning commented.

"What [Computer Mart] considers to be a business system is a complete turnkey package it can present to the businessman and teach him how to run so that he can immediately do something with it by running at least part of his business paperwork," Dunning pointed out.

Next year, a large number of suppliers might configure slightly customized hardware and software for small business purposes, but providing the support and writing programs to handle all of the data functions will be a problem, he said.

The storage requirements necessary for a successful small business system are also beyond the capabilities of most microsystems, Dunning continued. "You can just get 5,000 items on a dual-floppy disk system and that's not practical because the person might go to 10,000 items and he'd be out of luck."

In the meantime, users who decide to purchase microcomputer business systems this year will have to settle for "pig in the poke" machines — packages that take so much effort to customize that they are overpriced and usually fall short of doing the job.

However, there are a few rays of hope in the horizon for the underdeveloped business micro system and reliable packages could trickle into the market as early as February or March, Dunning stated.

Community DP Resources Coming for Boulder Residents

By Ann Dooley
CW Staff

BOULDER, Colo. — The Boulder Community Center is working on several innovative techniques to bring more information and automated technical expertise to the community it serves.

For the last year, the center has been sponsoring DP education at its Community Free School, where children and adults have the opportunity to learn computer programming and application techniques. The Free School, which uses an Alpha Micro AM-100 system with 64K of random-access memory (RAM) to process its mailing lists, registration and other business activities, also uses the equipment to instruct community residents in computers.

Classes in computer programming are held for children in the afternoon after school and adults can attend classes in the evening. Currently 25 adults and 30 children under the age of 14 are learning programming techniques using the Basic language, according to Stephen K. Elliott, project coordinator. The Free School uses six terminals, a mixture of Digital Equipment Corp. Decwriters, IBM Selectrics and Lear Siegler, Inc. ADM-3. The system also uses four Persci, Inc. floppy drives, Elliott noted.

In order to take the computers out of the classroom and "into the streets," the Free School is planning to set up terminals throughout the city so that citizens can access the system for community information. Elliott plans to install terminals with built-in coin boxes and charge users 50 cents to use the system.

The system would include information of community interest such as items for sale, a calendar of events, personal messages, lost and found items or anything a user wants displayed, Elliott said. A user could call up an item of interest from a menu of different items. The user would only have to respond to prompting from the computer, which "takes the user where he wants to go." In

(Continued on Page 60)

Intel 8086 Development Aided

WALNUT CREEK, Calif. — Designed to support applications program development for the new Intel Corp. 8086 16-bit microprocessor, the Microbench 8086 fom Virtual Systems, Inc. is a family of software products that operate in conjunction with the Digital Equipment Corp. PDP-11 and LSI-11, the firm said.

Included in the Microbench 8086 software are a relocating assembler, linking loader, librarian and object file formatter. The assembler supports macro and conditional assembly capabilities and cross-reference listings and provides for memory addressing. The loader provides linkage facilities, selective loading from Libraries and directives for specifying read-only memory (ROM) and random-access memory (RAM) alignment boundaries.

The object file formatter produces binaries in compatible formats for use with most programmable read-only memory (Prom) programmers and emulation systems.

Perpetual license fees start at $1,695 including documentation and first year's maintenance from Virtual Systems, Inc., Suite 406, 1500 Newell Ave., Walnut Creek, Calif. 94596.

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TRS-80 Coding Provides Dumps, Helps With Typing

FULLERTON, Calif. — Faulk & Associates Software has introduced two programs for the Radio Shack TRS-80.

Hexdmp provides hexadecimal memory dumps with all printable characters printed to the right of each line. The program will run either alone or as the "U" command under the RSM-1 monitor program from Small Systems Software.

Touch helps the TRS-80 programmer learn touch typing. The program contains the basic instructions for finger position and teaches proper use of the fingers in striking the keys. A series of "pointer" drills in which the computer selects keys at random to be struck and which can be limited to either the left or right hand or cover the entire keyboard are part of the program.

Hexdmp costs $12.95 and Touch $7.95 plus 6% sales tax for California residents, from Faulk & Associates Software, 2531 E. Commonwealth Ave., Fullerton, Calif. 92631.

Zilog Adds Card Enclosure

CUPERTINO, Calif. — Zilog, Inc. is offering a table-top standard card enclosure (SCE-4) to make it easier and faster to use Zilog's family of microcomputer boards in the system, the firm said.

The SCE-4 comes with four slots for Zilog boards and in a single enclosure combines power supply, internal system cooling fan and external controls. The enclosure is designed for switchable operation from 110- to 220V.

The enclosure features a reset button synchronized to the reset of the single-board Z80 and an interrupt or break button to enter interrupt subroutines manually. The unit also features I/O connectors for serial and parallel I/O to the board and cutouts for additional I/O connectors that can be added.

Cost of the SCE-4 not including any boards is $795 for quantities up to 10 from Zilog, Inc. 10460 Bubb Road, Cupertino, Calif. 95014.

City Starts DP Projects

(Continued from Page 59)

this way, no technical expertise would be required, although there would be instructions for use with each terminal.

The terminals would be installed at shopping malls, libraries and other places where large groups of people would pass by, Elliott said.

Successful Test Run

The project has been in the planning stage for some time because the community group has had difficulty getting the concept funded sufficiently. But the community reponse would definitely be high, Elliott claimed, since the concept was tried on a limited basis with successful results. One terminal was placed in the Boulder Public Library for a short time and 400 people, including many who had never used a computer before in their lives, tried it out, he noted.

Once funds are available, 12 terminals will be placed in key spots around the city for use by residents. A decision has not been reached as to what kind of equipment will be used but the terminals would have to be able to stand frequent use and be adaptable to the coin boxes. When the project is fully implemented, Elliott wants to have 24 terminals positioned in Boulder, with 12 terminals accessible simultaneously.

The system would be self-limiting so that after 90 days all the messages would be cleared and new ones would be put in or old messages would have to be refiled. A dictionary would also be incorporated into the system so that it could be programmed to blot out obscene words.

If funding becomes available, Elliott plans to have the system up and running by next September.

Generator for Tests Bows

ANAHEIM, Calif. — A programmable function/pulse generator available on the IEEE 488 bus, with high-speed testing performance, is being offered by Interstate Electronics Corp.

The 20-MHz Model 860 accepts general-purpose interface bus commands up to 100 times faster than competitive instruments, the company claimed. The Model 860 also provides selection of waveforms, parameter controls and operating modes.

Every pulse parameter is programmable, including independent rise-fall times, pulse delay and width, crystal-referenced frequency and exact burst count. The unit is particularly suited to high-speed testing of digital/hybrid circuits or incoming inspection testing, the firm said.

The Model 860 also provides sine, square, triangle and ramp waveforms in addition to its pulse compatibilities.

The Model 860 costs $3,995 from Interstate Electronics Corp., 1001 E. Ball Road, P.O. Box 3117, Anaheim, Calif. 92803.

Ohio Scientific Adds Programs

AURORA, Ohio — Ohio Scientific is offering users an expanded software library, ranging from games to sophisticated applications programs, on cassette or diskette.

The programs, which are available from retailers, cover personal, business and educational subjects such as annuity calculations, calorie counting, bond evaluation, ratio analysis and basic math as well as games like Lunar Landing and Star Trek. The programs range in cost from $6 to $600.

Ohio Scientific is at 1333 Chillicothe Road, Aurora, Ohio 44202.

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TRS-80 Gets Interface Module

SAN DIEGO — JC Enterprises has introduced an input/output interface, designed to expand capability of the Radio Shack TRS-80 microcomputer by providing four channels of programmable ac power control with 600W per channel and limited to a total of 1,600W.

The Model A828/TRS-80 can be used to sense switch closures, photo sensors and 5V logic levels; drive LED displays; and operate motors, solenoids and alarms.

The A828/TRS-80 is complete with a self-contained 5V power supply, interface cable, I/O port connector cable, metal enclosure and sample programs. The assembly is tested and ready to use by connecting the interface ribbon cables, the firm said.

The 8-bit input port is addressed with INP (0) function of Level II Basic or with T-Bug and Level I Basic. The 8-bit latched output port is addressed with Out O, N command of Level II Basic or with T-Bug and Level I Basic.

The A828 includes a TRS-80 interface cable and I/O port connector cable and costs $165 from JC Enterprises, P.O. Box 23445, San Diego, Calif. 92123.

Canadians Issue Invitation

STREETSVILLE, Ont. — The Toronto Region Association of Computer Enthusiasts (Trace) is inviting interested people to one of its meetings.

With 100 full-time members, two-thirds of whom have their own micro systems, Trace's goal is to foster communication and resource sharing among those interested in hobby computers. The meetings include one or two talks on micro-related topics and usually a system demonstration.

The club also has a monthly newsletter and a library of micro information. Other activities include flea markets, exhibitions and a software library.

Additional information is available from Ross Cooling, Box 545, Streetsville, Ont. L5m 2Cl, Canada.

Floppy Bows

CAMBRIDGE, Mass. — An intelligent dual floppy disk mass storage system offering high-speed track selection has been introduced by ECD Corp.

The ECD Biflex floppy disk is a 4.5-in.-wide, 512K-byte memory buffer mass storage system.

Designed for use with ECD's 7x microcomputer or Smart Ascii programmable intelligent terminal, the unit incorporates an 8080-based intelligent controller with IBM-compatible formatting.

The floppy disk is based on the Persci, Inc, dual diskette and utilizes single-sided, single density disks. It costs $3,900 from ECD at 196 Broadway, Cambridge, Mass. 02139.

Tarbell Basic Now Available

CARSON, Calif. — Tarbell Electronics has made available Tarbell Basic on cassette or disk. It is reportedly capable of disk interaction including saving and loading programs, chaining programs and loading data.

In addition to standard Basic features, several others have been added, according to the company. These include assignment of I/O, long variable names, cassette string data save, procedures with local variables and alphanumeric line labels.

Assign and Drop statements allow the user to assign or deassign as many as 10 physical devices to separate logical I/O devices. The interpreter occupies 21K of random-access memory, the firm said.

Both cassette and disk versions for the CP/M operating system cost $36 each. Source listing is available as a printout or on disk for $25 from Tarbell Electronics, Suite B, 950 Dovlen Place, Carson, Calif. 90746.

Racet Offering Basic Programs

ORANGE, Calif. — Racet Computes has made available two Basic programs, Timser and Y-Ybar, for use with the Radio Shack TRS-80 microcomputer with 16K bytes or similar systems.

Timser is a time series analysis program that fits data to nine different first, second and third order curves. Projected data and confidence limits and graphical displays of curve fit and variance are included.

The program provides for correction factors and functions to test seasonal variations, inflation corrections or cyclical variations.

Y-Ybar is an optical system design program that implements Y-Ybar diagram techniques, allowing manipulation of ray heights at lens surfaces, the firm said.

Timser (RD11C) costs $14.95 and Y-Ybar (RA31C) is priced at $19.95 from Racet Computes, 702 Palmdale, Orange, Calif. 92665.

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Stock Specialist Says:

'Going Public' Feasible for Small Firms

By Marcia Blumenthal
CW Staff

LOS ANGELES — Small high-technology firms in need of an infusion of capital usually overlook the option of going public. But a public offering is really feasible, even for companies requiring as little as $1.5 million of capital, according to Daniel C. Montano, a specialist in underwriting public issues for high-technology firms.

Recent changes in the regulations of the Securities and Exchange Commission (SEC) and the Carter Administration's relaxation of the maximum capital gains tax rate will make it easier for small high-technology firms to float public issues, Montano, vice-president of corporate finance for C.L. McKinney & Co., Inc., noted here recently.

Most small firms are hesitant to go public. A case in point is Randal Data Systems, Inc., which recently raised more than $1.2 million through a public offering, Montano pointed out.

Randal F. Walti, that company's president, had been skeptical about going public, thinking there would be no market for his company's stock. "There was a period of time when no one was going public. The thought of a company our size being publicly traded was ludicrous," Walti recalled. In 1976, only three companies with issues of less than $3 million went public, Montano said.

About two years ago, Walti put together a business plan to raise capital. The venture capital route was disappointing. "Here we were with sales of $4 million and venture capital firms were looking at us as though we were just starting up. The best offer we got from venture capitalists was $500,000. The cost of that capital was about what we would have expected to pay for $1 million to $1.5 million," Walti noted.

Fortuitously, Montano got in touch with Walti last December and suggested a public issue might be right for the company. Walti, interested but skeptical, agreed to talk to Montano.

Montano learned about Randal while reading a product announcement in the trade press. In fact, a thorough reading of trade journals for the computer and electronics industry is one way Montano learns about companies that may be suitable candidates for public offerings.

Instrumental in taking Microdata Corp. public in 1971, Montano has handled 41 public offerings in the past 11 years, with high-technology firms accounting for about 50% of those offerings.

In the middle of February, C.L. McKinney and Randal signed a letter of intent to make a public offering. Montano then assisted Walti in acquiring legal counsel and finding accountants to audit the firm according to SEC standards.

Because the Randal issue was small, an underwriting syndicate was not required. However, C.L. McKinney did offer 10,000 of the 300,000 shares in the issue to seven other brokers to sell.

The issue went on sale Aug. 21 and sold out in one hour and 45 minutes. "It wasn't my record for a sellout, but it was close,"

(Continued on Page 70)

U.S. Export Licensing Process Too 'Diffused,' GAO Reports

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The government's administration of export licensing is characterized by "diffused authority and a consequent lack of accountability to the public," according to the General Accounting Office (GAO).

A recent GAO report recommending a consolidated export licensing process noted it is "particularly ironic" that many exporters are awarded licenses but lose customers because the delays involved in the approval process cause them to fail to meet commitments.

The irony is compounded by the fact that the great majority of applications for export licenses are approved. Unfortunately for the DP industry, many of those applications turned down are for computers or related electronics products, according to GAO figures.

The GAO reviewed the government's export licensing procedures at the request of Rep. Jonathan B. Bingham (D-N.Y.), chairman of the House Subcommittee on International Economic Policy and Trade, and Rep. Don Edwards (D-Calif.), whose congressional district is the home for many electronics manufacturers.

The GAO investigation found that the management and authority for the licensing process are spread across so many agencies and offices that a lack of accountability and a failure to be responsive to U.S. industry results.

In theory, the Department of Commerce, through its Office of Export Administration (OEA), is supposed to control all exports from the U.S., except munitions and related technical data, which are licensed by the State Department, and nuclear materials and production facilities, which are licensed by the Nuclear Regulatory Commission.

The GAO found that in practice there exists an "export licensing community" consisting of Commerce and a group of consulting agencies, such as the departments of De-

(Continued on Page 70)

UK Promoting Use of Micros

LONDON — To assure that the UK keeps abreast of microprocessor technology, the government has launched a three-year program designed to inform industrialists about the advantages of using microprocessors in their products.

The government hopes to attract 50,000 participants to a series of seminars on the topic, each lasting about a day.

Eric Varley, Industry Secretary, said the government is appointing consultants to work with the National Computing Centre to plan the seminars. They will be part of the first stage of the Microprocessor Applications Project, which was announced last summer.

If the UK does not keep abreast of microprocessor technology, "We shall quickly be left behind, with grave consequences for employment, our standard of living and the quality of our social services," Varley said.

Last July the government announced the two-part plan. The first phase, estimated to cost about $7.5 million, consists of the seminars and consultant assistance. By the end of October, a list of 187 authorized consultants had been drawn up and the Department of Industry was considering paying a portion of the fees consultants would charge companies to assess the feasibility of applying microprocessors in their products.

The second part of the program calls for the investment of about $35 million to aid research and development projects for firms in the microprocessor industry.

The Department of Industry has received applications for support of 94 projects, the total value of which is about $7 million. Of these, 17 have been approved at a cost to the government of about $600,000, and 57 projects are still under discussion, Varley said.

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More than a computer company

Randal Sees Distribution Major Growth Factor

By Marcia Blumenthal
CW Staff

TORRANCE, Calif. — "We probably won't reach $55 million in sales until 1982," Randal F. Walti, president of Randal Data Systems, Inc., said here recently, adding that his company had planned to achieve that goal in 1981.

But Walti wasn't complaining, considering the company's 1978 revenues just topped $4 million.

Even with competitors such as Data General Corp. and Digital Equipment Corp., Walti thinks Randal, a manufacturer and marketer of small business systems, will be able to meet its objective because of the way the company distributes its products.

Its major products are small business systems — the Randal Systems 100, 200 and 500 — which cost the end user between $30,000 and $70,000. Randal also sells software packages, usually developed by its distributors.

Products aside, "We are in the business of putting distributors in the field," Walti said simply. The company currently has 80 distributors and expects to have 500 by 1981, adding distributors at the rate of four to six per month, Walti claimed.

This distribution method was what attracted Daniel C. Montano, vice-president of corporate finance for C.L. McKinney & Co., Inc., who was instrumental in persuading Walti to take his company public.

The public offering of 300,000 shares of common stock at $4 per share, underwritten by C.L. McKinney, was made Aug. 21 and was sold out in 1-1/2 hours. (See related story on Page 63).

To finance the company's four-year growth plan, which calls for more than doubling revenues annually, Walti expects the company will have to float more public issues.

Another boost to revenue that Walti is currently investigating is acquiring a company in the yearly revenue range of $3 million to $8 million.

Major Funding Source

The major source of funding, however, is Randal's distributors. "Every time we add a new distributor we get $25,000 to $100,000 added to our capital structure; adding four distributors a month provides monthly working capital of $100,000 to $400,000," Walti figured.

Part of that capital is derived from sales of demonstrator models to distributors. Distributors signing on with Randal must buy a demonstrator to keep in their offices. Randal helps with the software and assists the distributor with selling aids.

Moreover, distributors are required to take a training class which costs $4,750. Distributors are not given exclusive territories; in fact, Walti envisions as many as 20 distributors in Los Angeles.

Walti considers the distributors' investment in a demonstrator and the training course a commitment to sell Randal products.

Low-End Systems

The products are aimed at the low end of the small business system spectrum, costing the end user (often a first-time user) between $30,000 and $70,000. "I cannot foresee offering a system for more than $100,000," Walti said.

The emphasis on the low end of the small business system market is the reason Randal is concentrating on developing the Microlink product line, which is smaller than Randal's System 100, Walti said. About $100,000 of the funds gained from the public offering is being added to research and development expenditures for Microlink, which is in its final development stage.

Although competition in the marketplace, particularly from the likes of DEC and DG, is keen and was one of the risk factors mentioned in the prospectus for the stock offering, Walti appears unperturbed.

"DEC and DG won't completely commit themselves to the OEM," Walti asserted, pointing out that those companies' salesmen will take an order directly. "Every dollar we spend is in support of our distributors," he maintained.

Even with DEC predicting a downturn next year, Walti remains confident that his company can still reach that $55 million sales goal by 1982.

"DEC should be cautious," he countered. "It has to grow $300 million to $400 million a year to maintain its previous growth rate. The effect the economy has on DEC is considerably different than on us. We don't have our complete distribution network in place yet; we barely have tapped the international marketplace."

International Market

The international marketplace is a primary target for Randal, Walti pointed out. The company has already signed three foreign distributors, including Holland's Cimi, and is on the verge of signing a large Australian distributing firm.

Foreign distributors are attractive because they usually are large, established firms, Walti explaiend.

Aside from its small business systems, Randal has a subsidiary, Dataforce, which provides maintenance for Randal's distributors and for other manufacturers. That sector of the business is growing as fast as, if not faster than, the small business systems sector, Walti noted. In fact, a regional service company is a likely business for Randal to acquire.

Other types of companies being sought for acquisition deal with OEM supplies, word processing systems and sophisticated copying systems.

"We are concentrating our efforts on what's happening in that small business marketplace and trying to find out what the user needs," he said.

"If there had been a Randal Data Systems in 1972, I would have probably still been a distributor," Walti said. But at the time, he was a manufacturer's rep. "That was not the kind of marketplace I wanted. It was low margin and hardware-oriented and didn't solve problems for people. "I wanted to solve problems."

Supershorts

Wang Laboratories, Inc. has received an industrial tax exemption in Puerto Rico and plans to start limited manufacturing operations there this month. In addition, the firm voted a quarterly dividend of 1.5 cents per common share and 4 cents per Class B common share, payable on Jan. 30 to shareholders of record Dec. 11.

— — —

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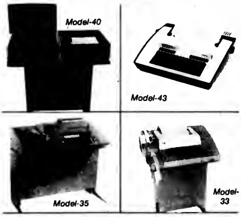

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Can Be Frustrating Ordeal

Case Shows Export License Snags

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Obtaining a government license to export sophisticated equipment or technology can be a lengthy and serpentine process.

A major cause of this problem, according to a recent General Accounting Office (GAO) report, is lack of centralized management and accountability for the approval process (see story on Page 63). The Department of Commerce Office of Export Administration (OEA), which is supposedly responsible for such license approvals, is a quagmire of diffused responsibilities, the GAO found.

A recent case history of an application to export semiconductor manufacturing equipment is illustrative of the frustrating and often costly experience a vendor faces in applying for an export license through the OEA:

August 1977: The applicant applied for a license to export the equipment to an Asian country. Its letter of credit was due to expire in mid-October and the equipment was scheduled to be shipped in mid-September.

September 1977: The application was received in OEA. The value of the equipment was about $8,100. A licensing division reviewed the application for about 12 days, then it was referred to the Policy Planning Division. That office referred the application to the Energy Department after five days, or one day after the scheduled shipping date.

October 1977: Since the application had not been approved by the scheduled shipping date, the applicant's letter of credit had to be extended and a new shipping date for mid-December was arranged after consulting with the consignee.

The applicant called an OEA licensing officer twice in the last two weeks of October to determine the status of the case; each time, the licensing officer replied he had no information on the status of the application. At the end of October, and after 42 days of review, Energy recommended approval.

November 1977: Four days after Energy recommended approval, the applicant again called the licensing officer, who said he still had no information on the status of the application. The applicant asked an official in a Commerce regional office to inquire about the application; he did, but also to no avail.

The applicant during this period mistakenly believed the Defense Department was holding up the application, whereas the application had not been referred to Defense. In mid-November, OEA sent the application to the Subgroup on Nuclear Export Coordination, which recommended approval without controversy. Six days later, OEA's Policy Planning Division recommended approval, and the application was approved eight days later, at the end of November.

On the day after Policy Planning recommended approval, the applicant cabled the consignee, asking him to send more information about the intended use of the equipment, stating that this information might help the government make a favorable decision.

December 1977: On Dec. 1, the applicant again asked the licensing officer for information about the application, but the officer again said he had nothing to report. Five days later, the applicant received the license.

DEC Set to Pay Some Who Took Maternity Leave

MAYNARD, Mass. — Digital Equipment Corp. has agreed to pay about $400,000 nationally in retroactive disability benefits to women who took leaves from work because of pregnancy.

Last May, the Massachusetts Supreme Judicial Court required that all companies that have disability plans pay women employees for pregnancy and childbirth leaves, just as they would for other illness covered under the disability plan. That ruling was an interpretation of the state's Sex Discrimination in Employment law, Assistant Attorney General Joan Entmacher said.

DEC's decision came after lengthy consultation with the state's attorney general, Francis X. Bellotti. Bellotti's office had not brought suit against DEC, a source noted.

More than $200,000 of the total retroactive benefits will be paid to Massachusetts employees. DEC, with 17,000 employees, is the fourth largest employer in the state and is expected to set the standard for the state's 278 employers who were investigated regarding the disability benefits, the attorney general's office said.

Entmacher said the agency could not reveal how many computer companies were involved in the investigation until the investigation has been completed.

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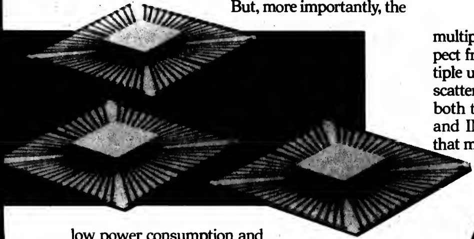

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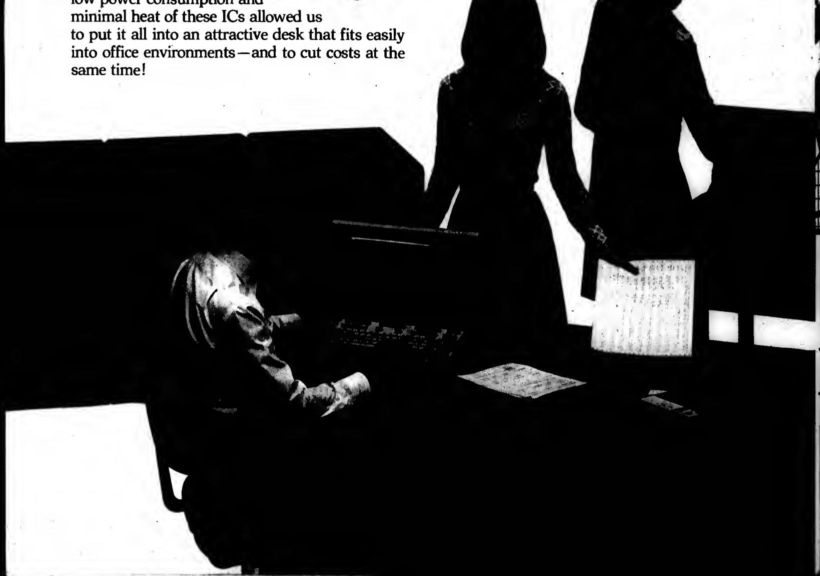

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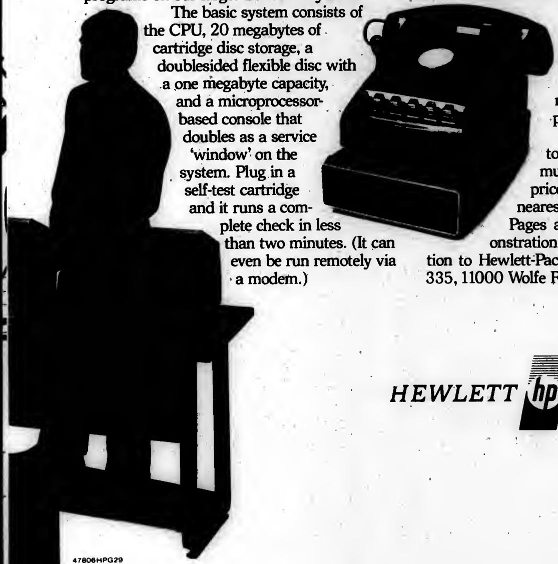

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Public Issues a Reality for Some Small Firms

(Continued from Page 63)

Montano said.

In determining a firm's ability to attract a market for its stock, Montano's major task is assessing whether he can trust the owners or managers of the companies under consideration. "That's 89% of my work," Montano explained.

In his opinion, there are two categories of high-technology firms. The first group have obtained venture capital and are inundated with professional advice. Every idea the company comes up with is going to be debated by all the owners, he said.

The other type of firm has one founder who owns a substantial portion of the firm even after the public offering. Because of this strong ownership position, the owner, usually the driving force behind the organization, cannot be easily voted down. Randal fell into this latter category. Walti still owns about 54% of his company.

Easier to Go Public

Recently, several regulations and laws have been passed to make it easier for a small firm to go public or attract investors. For instance, the SEC changed its Regulation A exemption, Montano noted. The revised exemption makes it less expensive for firms wanting to raise up to $1.5 million to float a public issue.

Until now, a firm's expenses for attorneys, auditors and financial printers could amount to between $40,000 and $145,000, Montano explained. With the new exemption, those costs can be reduced by one-third to one-half. Randal's issue cost $63,000 to mount and with the new exemption probably would have cost around $35,000, Montano said.

Another boon to small stock offerings is the Revenue Act of 1978, which, among other provisions, allows the issuance of $1 million — up from $100,000 — of Section 1244 stock. This stock privilege is granted to small businesses and allows investors in those businesses to write off any losses incurred in those investments against ordinary income as opposed to the capital loss method.

Export Licensing Process Too Diffused, Report Says

(Continued from Page 63)

fense, Energy and State, the Central Intelligence Agency and the National Aeronautics and Space Administration (NASA). At each of those agencies, the study also found, "applications may be referred to a number of specialists for technical review."

At the OEA, applications are managed and reviewed by the Operations Division, one of several licensing divisions, the Policy Planning Division and Exporters Services. Commerce makes final licensing decisions unilaterally in some instances; in others, decisions usually are made only after the unanimous consent of the consulted agencies is secured.

Not only is the licensing process inefficiently structured, the GAO found, but the efficiency of the system as it exists is getting worse.

According to the GAO, while the total number of license applications increased by 5% in 1977 over 1976, the number of applications taking more than 30 days to process increased by 47%, applications taking 90 days to process increased by 52% and those taking 180 days increased by 50%.

The convoluted series of reviews and approvals necessary before a license for export of sophisticated electronic equipment is granted explains the delays DP vendors experience. But according to the GAO report, it could be much worse. OEA's computer division is aided by an automated system, the "License Accounting and Review System," that can relate the licensing history for computers to pending applications.

That system, the GAO said, is the only one of its kind in the OEA. And the GAO was so impressed with the enhanced efficiency afforded by that system, it recommended it be expanded to give OEA an automated system for retrieving "precedential information" about other types of commodities.

Stating "the government has an obligation to sellers to ensure that the decision-making process itself does not damage a new or continuing business relationship," the GAO report offered several other recommendations for making the license application review process more responsive to industry.

"Responsiveness to exporters can best be increased," the GAO said, by consolidating management responsibility in the Commerce Department, while continuing to retain the "government's corps of technicians at each of the existing agencies."

Responsibility for making technical evaluations should rest, "as it does now, with technicians in each department and agency comprising the consulting system," the report recommended.

The OEA should consolidate all technical evaluations, it added.

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Dr. James W. Jewett
Vanderbilt University, and President, Telco Research Group
"Communications Systems — Optimizing 1980 Alternatives." How can users select from new carrier offerings in the packet and satellite areas? What compromises and trade-offs are needed with existing communication network investment?

Additional speakers to be announced.

Richard L. Nolan,
Chairman, Nolan, Norton & Company
"Planning to Manage the New Systems Technology in the 1980's." Managing and adapting to fast-paced changes in technology and marketplaces; cost-benefits analysis and cost control.

Profits Could Outweigh Problems

U.S. Computer Exports to Japan Seen Profitable

COSTA MESA, Calif. — The export of U.S. computer products to Japan raises difficulties, but the potential profits outweigh the problems, a U.S. computer industry executive said here at a recent international trade symposium.

Speaking before the U.S.-Japan Symposium on "Trade Imbalances: Business Opportunities in Fact," Donald F. Orr, vice-president and general manager of Pertec Computer Corp.'s (PCC) Business Systems Division, said any exporter who has established a position in the Japanese market can attest to its importance. "The key to success is understanding the market differences so they do not become obstacles in penetrating this vast, rapidly expanding market."

Japan's gross domestic product grew at a rate of 28% over the past five years, Orr noted. The installed computer base there is the largest outside the U.S., but computer exports to Japan rank below those to Italy.

Paternal Practices

"The Japanese economic and political scene is stable, and no other market offers greater potential for the U.S. computer exporter; the problem is getting started," Orr noted.

Traditionally, Japan's business philosophy makes many commercial practices there more paternal, he explained. It takes longer to obtain decisions which are often the result of committee action.

In addition, the Ministry of International Trade and Industry (Miti) exerts strong government influence on marketing activities.

"The best approach to the Japanese market appears to be through the classical dealer and distributor relationship," Orr suggested. "Since opportunities to buy a Japanese company are rare, and direct operations carry the risks and problems of addressing an unfamiliar market, the dealer and distributor route appeals to many U.S. firms."

U.S. exporters seeking potential distributors in Japan can turn to trading company subsidiaries, the equivalent to the U.S. conglomerate. These subsidiaries have great strength in Japan.

"They are financially backed, have sound reputations and seasoned management. Many have U.S. operations with offices in New York and Los Angeles," Orr said.

Other agencies that provide assistance in locating Japanese distributors include the trade shows in Asia sponsored by the U.S. Department of Commerce, the Tokyo Trade Center, the Japan Trade Center in Los Angeles and the Japan Trade Association.

Slow, Orderly Approach

After a vendor finds a trading partner, it should expect a longer than usual period for start-up, since Japanese companies may take a slow, orderly approach to introducing a product, Orr pointed out. For computer products, this may include rewriting or modifying software, translation of literature and inclusion of Katakana — a Japanese business alphabet — in keyboards or CRT screens.

It helps if the distributor sends technical staff to the U.S., but there is often little the supplier can do to assist translation. The start-up process may be frustrating, Orr said, but it is a necessary and valuable step in building a faithful, long-term business partnership.

The U.S.-Japan symposium was jointly sponsored by the U.S. and Japanese governments as well as trade associations and universities in the Orange County area with the cooperation of the Orange County (Calif.) Chamber of Commerce.

Data 100 Accepts Bid By Northern Telecom

MINNEAPOLIS — Shareholders of Data 100 Corp. have approved the acquisition of the company by Northern Telecom Ltd. of Montreal.

Under the terms of the acquisition, Data 100 stockholders will receive $20 for each share of common stock. Data 100 will become a wholly owned subsidiary of Northern Telecom and will be managed by Northern Telecom Systems Corp. along with Sycor Corp., which has recently been acquired by Northern Telecom.

The final merger supersedes an agreement in principle reached last May under which Data 100 agreed to merge with McDonnell Douglas Corp. [CW, June 25].

Northern Telecom recently agreed in principle to sell most of the assets of its Nedco and Zentronics Ltd. units to Westburne International Ltd.

Host Organization and Registration Information

IITI The International Information Technology Institute, the program manager, is a non-profit organization chartered to provide professional development and educational support to information systems executives. It draws on the skills and experience of highly qualified consultants, users, vendors, and university researchers to address key issues in information systems planning, applications, computing economics and technology assessment. IITI programs emphasize practical presentations by skilled speakers, as well as audience involvement in pre-conference studies and issue definition.

ACT Advanced Computer Techniques Corporation is an international firm that provides management, product planning, and product implementation services in a wide variety of areas within the information systems industry. These services include: facilities management, feasibility studies, problem analyses, systems analysis, office automation, service bureau operations; programming project management and systems application software development.

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Growth of Voice Communications on Horizon

NEW YORK — The use of voice communications for data input and output in both industry and the home will grow substantially starting next year and into the 1980s.

That was the conclusion of a Qantum Science Corp.'s "Speech Processing Technology Report," which further predicted that speech recognition, speaker verification and digital speech synthesis will be the most widely used speech processing applications.

While most of these systems are still experimental and the few that are commercially available have limited technical capabilities, two factors will spark greater acceptance of speech to interface man with machine, according to the report.

One is the rapidly decreasing cost of digital storage and processing and the other is what the report called a long-term trend in information processing to accommodate human rather than machine characteristics.

Voice communications offers certain advantages over machine-compatible I/O media such as kevboards or character displays, the report said. Among speech's benefits are that it:

- Is convenient.
- Already has a communications network with terminals — the telephone system.
- Can be used as an alternative channel when hands or eyes are otherwise occupied.
- Provides faster input to machines, especially when combined with human creative efforts.

Speech's Disadvantages

However, speech, which evolved for human communication, does not lend itself to simple machine programming because it is noise-tolerant, can correct errors at several levels and conveys information through its symbols in a non sequential, context-independent manner, the report pointed out. By contrast, keyboards or character displays usually encode and decode context-independent information sequentially.

Because of these differences, speech processing requires greater computational resources. Technological advances in speech recognition, speaker verification and digital speech synthesis, therefore, have been slow in coming but will proceed at a faster pace as a result of electronic component price reductions.

Today, speech recognition capabilities fall into three categories: limited vocabulary control and command language systems, large vocabulary natural language systems and systems that can extract a limited amount of information from speech.

Limited vocabulary speech input systems are commercially available from Threshold Technology, Inc., Dialog Systems, Inc. and Interstate Electronics, Inc. for a minimum of about $10,000 for a single terminal, the report noted.

Component price reductions are expected to bring system prices down and increase sales volumes. For example, the report predicted a 60-word vocabulary recognition terminal will cost $4,000 to $5,000 in 1979, less than $2,000 by 1981 and about $500 in OEM quantities by 1985.

Between 1982 and 1984, office product and electronic firms will dominate the market for limited-vocabulary, continuous speech recognition systems.

Bell Laboratories, Univac and Xerox Corp. are among those firms actively researching limited-vocabulary speech input systems.

Large vocabulary natural language systems have not yet moved out of the research and development stage, and the report predicted they will not be commercially available before 1985.

Present research efforts in this area are limited to Carnegie-Mellon University and IBM. IBM has achieved 71% word recognition from a subset of natural text using a 1,000-word vocabulary by executing about 80 million instructions for each second of speech on a 370 system.

For real-time processing, this is equivalent to 30 IBM 370/168s or about 500 16-bit microcomputers, the report noted.

With Acceptance, Growth

Use of speaker verification and digital speech processing systems will grow as speech recognition is more widely accepted, the report said. Presently at the R&D level, speaker verification systems will be commercially available from 1980 as extensions of speech recognition systems and by 1984, as text-independent systems for high-security control functions.

Availability will depend on lower storage and computation costs, according to the report. Today, storage costs for text-dependent systems are about 25 cents per user for reference data, while it costs up to 5 cents for one identification with a large, general-purpose computer and under 1 cent when a microcomputer system with analog preprocessing is used.

Heading the research effort in speaker verification are Bell Labs and Texas Instruments, Inc., which installed an operational entry control system.

Two Synthesizers

The two types of systems being used for speech synthesis are word synthesis systems, marketed at $2,000 to $4,000 per system, and experimental systems that synthesize sentences.

By 1981, the report said, word synthesizers will be available for $200 to $400 and by 1985 they will cost about $100.

The study is available to Management Action Program in Technology subscribers for $19,000 and to nonsubscribers for $24,000 from the company at 245 Park Ave., New York, N.Y. 10017.

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For Telephone Administration

HP Signs Contract With Nationalist Chinese

PALO ALTO, Calif. — Hewlett-Packard Co. has signed a contract with the visiting Republic of China trade mission for more than $485,000 worth of DP equipment. The purchase is part of an ongoing effort by the Nationalist Chinese to reduce their trade surplus with the U.S., according to a company spokesman.

The 45-member trade mission made its first stop in San Francisco recently to sign prearranged contracts and hold seminars for U.S. business executives. The group then embarked on a 45-day, 20-state tour during which it expects to purchase more than $500 million worth of U.S. agricultural and industrial products, the spokesman said.

The HP contract is for three HP 1000 computer systems and peripheral equipment to be installed next May at the headquarters of the Taiwan Telecommunication Administration (TTA) in Taipei. The systems will modernize the present manual method of logging and managing telephone equipment trouble called in by customers, the spokesman said.

The initial system will consist of two linked HP 1000s connected to 55 HP CRT terminals, which will be used by operators to enter subscribers' trouble reports. Six disk drives, each with a data storage capacity of 50 million bytes, will be accessible by both computers for data retrieval and data base updates, the spokesman noted.

Repair update information will be entered into the system via nine printing terminals located in TTA's district and repair offices throughout Taipei. The third HP 1000 will be used as a backup system.

George Cobbe, marketing manager for HP's Intercontinental Operations, said, "The order came less than a year after TTA's order for more than $850,000 worth of computers and peripherals for computerized telephone director inquiry systems. The seven HP 1000s installed earlier this year modernized TTA's manual method of finding customer phone numbers."

Other Contracts

Kennedy Co. has been awarded a contract in excess of $250,000 by Seiko of Tokyo, Japan for its Model 9100 tape transport to be used in Seiko's IBM Series/1-based small business systems. This agreement is for two years with renewal options.

General Automation, Inc. has received a contract from the Montana Energy and MHD Research and Development Institute, Inc. to design, develop and install a distributed data acquisition network valued at more than $1 million.

Computer Sciences Corp. has been awarded a $129.6 million contract to process claims for California's Medi-Cal program. The contract runs for five and a half years.

Univac Corp. has been awarded a contract by the Internal Revenue Service Data Center in Detroit for a Univac 1100/82.

Logicon, Inc. has received a $2.1 million Air Force contract to continue its work in the design and development of a new North American air surveillance system.

Ontel Corp., a subsidiary of Caesars World, Inc., has received an OEM contract valued at more than $1.5 million from Control Data Corp. The contract calls for a two-year shipment of the basic display terminal Ontel also uses in its proprietary OP-1 intelligent terminal system.

Rockwell International's Electronic Systems Group has been awarded a $12 million contract by the U.S. Air Force for Transportable communications systems.

Cubic Corp. has been awarded two contracts totaling $13.7 million by the Hong Kong Mass Transit Railway Corp. for automated far collection equipment.

Contracts

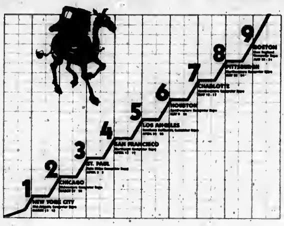
Control Data Corp. has received a $1.2 million contract for a central DP system at Patrick Air Force Base, Fla. The system will provide range safety data for the Trident missile test program.

Computer Devices, Inc. has signed a contract to provide more than 400 desk-top time-sharing terminals to Interactive Data Corp.

The U.S. General Services Administration (GSA) has awarded 11 contracts worth $25.6 million. Five of the contracts were awarded to small businesses: CPT Corp., Capitol Consultant Services, American Hospital Supply, Norward Industries Inc. and Alliance Rubber Co. Other contracts were awarded to Eastman Kodak Co., Addressograph-Multigraph Corp., Dictaphone Corp., General Electric Co., Tektronix, Inc. and Hewlett-Packard Co.

Comshare, Inc. has finalized a four-year contract with Dayton-Hudson Corp. No other details of the contract have been made available.

9 STEPS TO PROFITS!



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Large Savings and Loan Service Bureau needs Programmer/Analyst with strong DEC background. Experience with DEC Communications equipment and bi-synch very helpful. Projects will include EFTS switching, device handler implementation, and memory management implementation. Excellent benefits and good working atmosphere. Send resume or call collect: Stacy Litvak, Mid-Continent Computer Services, 14 Denver Tech Center, 8880 DTC Parkway, Englewood, Colorado, 80111, 303-771-8000.

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To teach computer operations and programming. Includes IBM 360/370, DOS/OS, COBOL, PL-1 and FORTRAN. For application and position information contact:

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Corporate Staff MANAGEMENT INFORMATION SYSTEMS

Florida Location

Harris, a Fortune 500 Corporation, has established a new facility in Melbourne, Florida, for corporate MIS operations. This provides an outstanding opportunity for career growth and recognition for creative, proven, results oriented professionals. Experience with electronic industry desired.

Staff Level Computer Performance Analyst

Degree with minimum of five years operating systems level experience in OS/MVT, VM, MVS environments. Responsibilities include establishing hardware performance monitoring methods and generating reports and recommendations for fine tuning large scale IBM hardware/software systems. Knowledge of teleprocessing systems is vital in assisting new users in installing teleprocessing monitor software and application programs and in assessing performance data and recommending response time improvements. Also must be able to interface with hardware vendors in negotiating procurement and leases.

Minicomputer Software Specialist

Degree with minimum of three years experience with minicomputer operating systems internals. Requires knowledge of minicomputer operating systems and teleprocessing monitors. Knowledge of commercial applications and data base recovery methodologies on minicomputers also desired. To perform programming in the DBMS/Operating System/Application Program interfaces to achieve maximum performance of commercial applications on a minicomputer for both stand-alone and distributive processing on Harris Computers. Salary - open.

Analyst/Programmer Computer Billing System

Degree in Accounting, Computer Sciences or related field required with at least three years of software experience. Responsibilities include analysis and programming to render Johnson Systems, Inc. OS Job Accounting System a means for billing Users of Corporate Data Center. Interfaces with users required in resolving billing problems and designing reports to satisfy management information and billing needs. Also responsible for configuring algorithm unit charges on an annual basis.

Systems Programmer

Degree and at least two years of experience with MVS and JES2 or JES3 internals with prior MVT experience. Experience in systems programming on large-scale IBM systems to assist in planning and converting from MVT to MVS.

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Increased use of data base technology and on-line systems requires qualified MIS professional to monitor and administer the use of automated data storage systems. Specific responsibilities include development of a formal methodology to ensure effective and efficient use of a multibillion character disc storage environment; implementation of an automated disc management system; on-going coordination of the data storage environment; and planning to ensure availability of sufficient resource to satisfy user requirements. Requirements include technical or business degree, with three years in a medium to large scale IBM OS environment. Experience with automated disc and tape storage systems (preferably ASM2 and TLMS); strong programming skills (COBOL and BAL) required.

Customer Services Coordinator

User oriented individual required to assist decentralized divisions in effective use of the Corporate Information Processing Facilities. Specific responsibilities include resolution of customer problems, analyzing job stream requirements, work flow scheduling, and general assistance to customers design and analysis of data base systems. Position requires at least three years of experience in business systems analysis and programming (COBOL, expertise in O/S JCL, strong communicative skills), prefer manufacturing systems experience.

Please send resume with salary history in confidence to: R.W. Underill, Harris Corporation, P.O. Box 430, Melbourne, FL 32901

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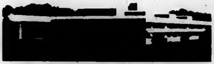

MINI-COMPUTER ANALYSTS

Software specification and design for real time mini-computer and microprocessor applications. Applications include data acquisition, message switching and communication system control. Successful applicant will work with other corporate elements to determine requirements and be responsible for systems design.

Requires BS/MSEE or BS/MS Computer Science plus 2-5 years experience in design and implementation of real time systems; knowledge of DEC PDP/11 or HP 21MX series minicomputers and operating systems or, knowledge of microprocessor capabilities desirable.

SENIOR COMPUTER OPERATOR

Requires 2 years experience on a large scale computer system and familiarity with OS/HASP and JCL.

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Experience in organization and implementation of computer reference and program logic manuals. Additional background and experience with the following:

- Use of FORTRAN and/or PL/I programming languages including knowledge of JCL.
- Development and implementation of computer documentation standards.

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Integrate hardwere and softwere into mini and microcomputer systems, involving communicetions end networking development. Needs knowledge of Aeync, Bisyno and SDLC. 5-7 yeers experience wilh BS/MS in CS or EE.

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Provide leadership in performence specificetion, system characterizetion, end measurement tools for interactive multiprogremming systems. Experience in OS desigo and performance analysis desirable.

Find out how upward migration can be a raality for you by forwarding your resuma with salary hietory and raquiremants to: Mr. Rick Valdhouea, Enginaaring and Manufacturing, Wichita, Dapt. R50, NCR Corporation, 3718 N. Rock Road, Wichita, KS 67226.

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SYSTEMS/PROGRAMMER

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ROCHE

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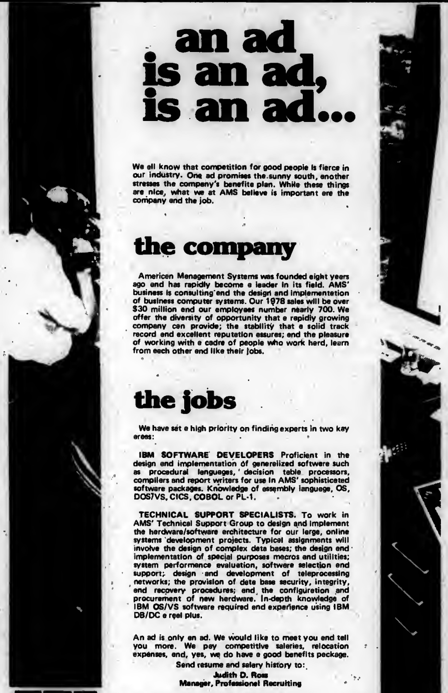

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the jobs

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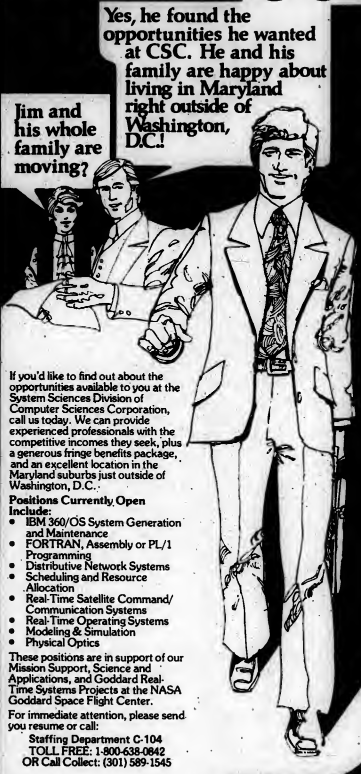
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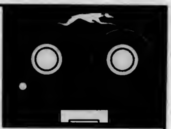

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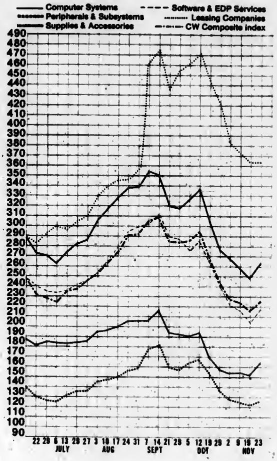

Earnings Reports

ANALOGIC
Year Ended July 31

	1978	a1977
Shr Ernd	$.93	b $.58
Revenue	35,145,869	24,300,306
Earnings	3,052,822	1,862,334

a-Restated to reflect acquisition of Data Precision Corp. in July 1978. b-Adjusted for 100% stock dividend paid in September 1978.

APPLIED DATA RESEARCH
Three Months Ended Sept. 30

	1978	a1977
Shr Ernd	$.37	$.30
Revenue	6,550,437	4,271,092
Disc Op Loss	.....	51,226
Earnings	527,866	412,891
6 Mo Shr	.98	.85
Revenue	14,902,133	12,016,238
Disc Op Loss	.....	81,852
Earnings	1,232,902	1,197,176

a-Restated.

CENTRONICS DATA COMPUTER
Three Months Ended Sept 30

	1978	1977
Shr Ernd	$.36	$.53
Revenue	21,644,698	15,925,966
Earnings	2,129,971	3,063,006

COMDISCO
Year Ended Sept. 30

	1978	a1977
Shr Ernd	$1.45	b$1.03
Revenue	153,282,265	112,727,966
Earnings	4,921,581	3,280,887
3 Mo Shr	.56	b.32
Revenue	52,179,061	29,162,503
Earnings	1,881,961	1,020,735

a-Restated to reflect accounting change for leases. b-Adjusted to reflect two-for-one stock split paid in September 1978 and three-for-two stock split paid in March 1978.

COMPUTER AUTOMATION
Three Months Ended Sept. 30

	1978	1977
Shr Ernd	.....	$.66
Revenue	$13,119,000	11,963,000
Earnings	(681,000)	1,319,000

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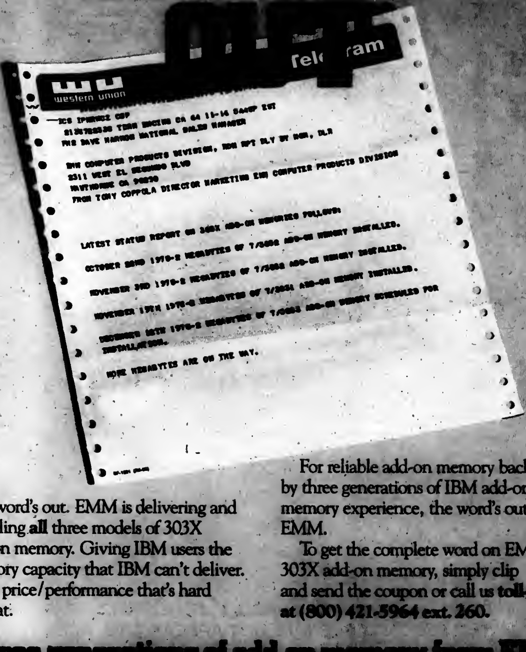

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